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Archive

The Subscription Magazine for Archimedes Users

Public Key Cryptography

6502 BBC Emulations

Notes on I-APL

Using the PC Emulator – Part 7

Reviews: FlexiFile, IFEL 4M upgrade, HU-Prolog, Tracker & Impression II.

Late again!

Sorry that this issue is even later than the January one. One reason is that Ali fell on the ice and broke her wrist (Ouch! Get well soon, Ali!) but the other reason is...

First Impression

At last, I've made the move and gone over to preparing the magazine on Impression II on the Archimedes. All I can say is that I wish I had made the move earlier. It is a bit slower at the moment because I'm having to learn as I go but I can see that it's going to be much quicker and easier in the long run.

My first impressions (sic) of Impression II are: (a) speed – this is mainly due to the screen update which is much, much faster but also, the spelling checker is noticeably faster than on the Mac and (b) what I can only call "immediacy". Part of this is that people send in their material on disc, it goes straight into the machine and straight into the magazine (no more spooling across from a BBC Master to the Mac!!). The other aspect of this immediacy is the direct in-memory transfer of RISC-OS – you edit something in !Edit or !Draw or !Paint and, even without saving it, drop it into an Impression frame and see the effect. If it's not quite right, you edit it again and drop it in again – very powerful and very impressive compared with the Mac.

Over to you!

This changeover to Impression means that you can help to speed up the preparation of the magazine by the way you send in your contributions. If you use Impression, we can give you a template to use so that, as you write your articles, comments, hints or whatever, you can add the familiar Archive styles as you go along.

I have explained this in a bit more detail on page 52ff but, basically, if you send in anything for publication, please send it in on disc. When we send the disc back (assuming it has a name and address on it!), we will send you a copy of the monthly program disc.

Thanks again for all your help,

Paul B

Government Health Warning – Reading this could seriously affect your spiritual health

Naturally, our thoughts and prayers are with the innocent people in the Gulf region (on both sides of the conflict) who are suffering so terribly at the moment. What can I say in the face of such suffering? Whatever I say will sound trite. All I can do is point to Jesus dying on the cross – He knows what it is to be innocent and to die a most cruel death. God didn't take the suffering away (even though he asked his Father to do so) but he *transformed* it. What looked like death and defeat was transformed into a glorious victory over the forces of evil. Does that sound far-fetched? Well, it's what the bible teaches. (There's no space to explain it here, but if you want to know, ask someone you know who is a Christian why the Jesus' death is so important.)

God does miraculously take suffering away sometimes – I've mentioned in this column how God healed my back – but whether He takes suffering away or helps us through it, He brings good out of the evil of suffering. Let us pray that this will be seen to happen in the Gulf region very soon.

Archive

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Products Available

• **Archway2** is here at last. Simtron's Wimp programming software has now appeared in its mark II format. It has so many features that you'll have to ask Simtron to send you a descriptive leaflet. The price is £99.95 + £5 postage from Simtron or £90 through Archive.

• **ArcMonitor** – ArcMonitor, Cambridge International's machine code monitor program has gone up in price from £24.95 to £29.95 (£28 through Archive).

• **ArcPinball** – Shibumi Software have produced a pinball machine on your screen for just £24.95 or £23 through Archive. It claims to be the closest computer simulation to the real thing. It has various backdrops and music tracks. One nice feature is the video snatches which appear at appropriate points during the action.

• **ArcTerm7** from The Serial Port is a full-featured comms package for just £79.95 (£75 through Archive) from "the comms guru" Hugo Fiennes. It offers TTY, ANSI, VT52, VT102 and Viewdata terminals with X, X-1k, Y, Y-g, Z and J modem protocols as well as Kermit, SEAlink, MNP2 and Vasscom. Other features include 100-number phone directory, call logging, script language and macro keys.

• **Bengali and Punjabi outline fonts** – Hampshire Microtechnology Centre have produced outline fonts for Punjabi and Bengali characters. These can be used with Impression, Poster, PenDown, Draw etc. Each language font is on a separate disc for £20 per disc plus £1 post & packing. Also on each disc is a file containing a printout of the font plus a keyboard overlay in Draw and Poster format.

• **Blowpipe** from The Serial Port is a "totally awesome horizontal shoot 'em up game" with 5 levels of "meteoric mega-action" and 2.5M of 256-colour graphics with 15 pieces of 4-channel stereo music all compressed onto two 3.5" discs for just £19.95 (£19 through Archive).

• **Capsoft Disc Nº1** – This disc contains various drawn fonts, borders, frames etc for use in DTP and !Draw. Useful for creating dropped capitals, posters etc. Send £6 cheque to B.J. Thompson, 8 Oldgate Avenue, Weston-on-Trent, Derbyshire, DE7 2BZ.

• **Careware Nº 12** – The latest in our series of charity discs is Careware Nº 12 which contains HU-Prolog. A review of this appears on page 40. *(We have raised over £35,000 for charity through Archive magazine during the last couple of years. Well done all who have contributed!)*

• **CJE ARM3** – There has been a bit of a problem with the software that was shipped with the early CJE ARM3's. Basically, it bore a remarkable similarity to the software written by Nick van Someren for the Aleph One ARM3. About the only thing that had been changed was the copyright string! However, CJE and Aleph One have settled out of court and Nick is donating a proportion of the compensation money to charity. CJE are re-writing their control software and so, if you have a CJE ARM3 and the modules on the disc are dated September/October 1990, contact CJE for details of how to get your free, legal version of the software.

• **Decibel Attenuator Circuit** – By any other name, this is a fan slower-downer. If you are fed up with the noise of the fan on a 310, 410, 420 or 440 Ray Maidstone has come to your rescue. He has produced an electronic speed control board (user-fittable) for just £18 +VAT (£20 through Archive). He has done careful temperature measurements to check whether effective cooling takes place at lower fan speeds and the evidence shows that you don't have to suffer Concord-type noises any longer!

• **Desktop Folio** from E.S.M. should be ready by the time you get this magazine. For £90 +VAT (£95 through Archive) you get the long-awaited, much-trialled, school-oriented "word-processor, desktop and interactive publisher".

• **Dongle Dangle** – We are now stocking dongle dangles for Computer Concepts' Impression dongles at £5. If your computer goes back against a wall, you probably find that the extra distance the dongle plus printer lead sticks out is a nuisance. The dongle dangle is a short flexible extension cable which will allow the dongle and printer lead to... yes, dangle... down behind the computer. It should also work for the WorraCAD dongle.

• **DTP Seeds** is a book of ideas for DTP – £8.45 from 4mation or £8 through Archive. This book has 100 pages of sample DTP output to show what can be done using the DTP facilities available on the Archimedes. It is not specific to one DTP package but gives general ideas about the sort of impressive output you can produce with good DTP techniques.

• **Educational materials** – G.A.Herdmann Educational offer a free catalogue of materials for DTP, electronics, educational games, advanced chemistry, data-logging, assessment and CAL. Just send them an S.A.E.

• **Equasor** – For those who need to put scientific equations in their Impression text, Computer Concepts' Equasor is what you need – £56.35 or £52 through Archive.

• **Expression-PS** – For those preparing Impression output for printing on PostScript devices including professional typesetters, Computer Concepts have produced a utility program (£23 from CC or £21 through Archive). This provides such facilities as control over screen density and screen angle, provides a selection of different screen designs, allows output on a variety of new page sizes, provides negative output and automatic font name conversion from Acorn to PostScript names.

• **File Handling for All** is the title of a new book from David Spencer and Mike Williams of Beebug Ltd. It aims to offer an extensive and comprehensive introduction to the writing of file handling programs with particular reference to BASIC. It applies to the BBC Micro as well as the Archimedes. The cost is £9.95 plus postage from Beebug. There is also a supporting disc for £4.75.

• **Giant Killer** from Topologika is a maths adventure game. It includes calculator games, number patterns, tessellations, map work, topology, time/space and logical puzzles. It is a well-established product that has only just come to our notice and sells for £19.95 or £18 through Archive. Also available is the Giant Killer Support disc at £17.50 (£16 through Archive) which is a disc of Giant Killer puzzles in graphical form.

• **Investigator II** – The Serial Port have an improved disc utility program providing sector level disc utilities allowing the accessing of discs where other methods fail. £27.95 from The Serial Port or £26 through Archive.

• **Iron Lord** – Another game ported across from the Amiga by Cygnus Software. It is a medieval adventure which also has arcade action and wargaming. The price is £19.95 from Cygnus or £18 through Archive.

• **Landmarks** – Longman Logotron have released the first two titles in this series which is aimed to complement the Landmarks Schools' TV series. Landmarks Egypt and Landmarks Second World War provide text and graphics data which pupils can interrogate. The packs are £19 +VAT each. (£20 each through Archive.)

• **Mad Professor Mariarti** – This is a maze-type game from Krisalis Software where you have to travel around through five laboratories avoiding being killed by nasties, and solving puzzles in order to complete all 100 screens. Sounds familiar? Maybe, but our two boys (aged 10 and 12) have been hooked on it for days. £19.95 or £18 through Archive.

• **Magpie** is a multi-purpose program aimed at primary and middle schools for doing project work. It can be used to combine pictures, text and sound samples and can even be used as a simple DTP medium using Acorn outline fonts. Magpie is £54 +VAT from Longman-Logotron or £57 through Archive.

• **Mental Maths** is Cambridge International's new mental arithmetic pack for £19.95 (or £18 through Archive) It is designed to work in with the National Curriculum attainment targets but "makes learning and practising mental arithmetic fun".

• **MicroNet removable hard drives** – The speed increases and the price falls! The average access time of the MR45 drives is not 25 milliseconds as previously stated but 20 milliseconds. Not astounding news, true, but the really good news is that we are now buying in big enough quantities to go direct to the importer and can therefore get an even better price. We have now brought down the price of the basic drive from £650 to £595 including VAT & carriage and, with an Oak podule, to £795. With the Lingenuity podule, it is £775.

• **OCR from Irlam** is still "not quite ready" – about three weeks. The cost will be £159 +VAT or £165 through Archive.

• **P.I.P.P.** – Cambridge International Software's Professional Integrated Project Planner is now available in four versions for primary, middle and secondary schools and for teachers' and resources centres. The cost of each package is £49.95 or £46 through Archive.

• **PowerBand version II** – 4mation are offering a free upgrade to Mark II – just return your two discs to them (not us). This new version clears up one or two minor bugs (as they say!), has lots of improvements to all aspects of the original game, allows the skill level of opponents' cars to be individually set, allows the number of opponents in Fun and Game modes to be set between 2 and 11 and allows you to adjust your own skill level.

• **Revelation** is an education-based art package from Longman Logotron (£76 +VAT or £80 through Archive.). It has been created with particular emphasis on facilities for taking images from other sources such as digitisers, scanners or video frame-grabbers and processing them to create totally new pictures.

• **Show Page** – For anyone interested in learning about PostScript and for those wanting to handle PostScript files from other computers, Computer Concepts have produced a PostScript compatible interpreter which runs in the RISC-OS environment (minimum memory 2M). The price is £149 +VAT or £155 through Archive.

• **Square Route** – At last a slightly different game – well, I've never seen it before. It has 250 levels and all you have to do in each level is "turn the right number of white squares into red". Simple? Not exactly, you have to use your brains. When you have completed all 250 levels(!) you get a special number which will allow you to send off for a further 250 levels for just £6.99. The game is not copy protected (making hard disc operation easy) but has an embedded serial number to enable its producers, Computereyes, to prosecute those who breach copyright. The price is £19.95 from Computereyes or £18 through Archive.

• **Tracker** is a music sequencing package for producing your own sound-tracker module for use in your own programs. £49.95 from The Serial Port or £46 through Archive.

• **VIDC enhancer & Taxan 795** – People using Taxan 795 monitors may like to know that Atomwide have produced a new module for use with their VIDC enhancer. This is a free upgrade if you send them a disc plus some stamps.

• **Worldscape** from The Serial Port is an emulation game in which you try to control the ecological balance of the world. You build cities, power stations, search for coal and oil, plant forests etc and see what the effect is on the ozone layer, temperature, pollution, sea levels etc. The price is £19.95 or £19 through Archive.

• **X_Image** is an image format conversion utility for PC compatibles (!!) which will convert from Acorn sprite format to TIFF and other PC image formats. Needs files on a PC format disc (using, say, !PCDir from Careware Nº7) and only costs £10 from Foster Findlay Associates.

Review software received...

We have received review copies of the following software & hardware: Capsoft disc Nº1,

Decibel Attenuator, File Handling For All, DTP Seeds, Maddingly Hall, PipeLine October 1990 and January 1991 discs, Carewares 4, 5, 6, 10, PRES's A3000 disc interface and DFS reading software and Minerva's (new) Business Accounts packages. A

Help!!!!

• **Disc format for Sun Sparcstation IPC** – I want to convert from this to A3000, so does anyone know anything about the disc format I need? I could go via MS-DOS, I suppose. Darren Sillett, Aldershot (0252–345641).

• **File recovery** – In DOS there are products such as PC Tools which allow the recovery of deleted files from hard and floppy discs. To my knowledge there is no such thing for the Archimedes. Obviously this will be difficult for E format, but any offers?

• **Hardware projects** – If anyone is interested in hardware projects on the Archimedes, I have some expertise in hardware and some contacts who can do some software. All we need is ideas! Does anyone have any suggestions of the sorts of things they would like to see hung on the end of an Archimedes? Or are you interested in getting involved in such a project yourself? If you have any such interest, contact me via the Archive office. Alan Bryant, Kent.

• **HP Deskjet Plus RISC-OS printer driver** – If you ask anyone for a printer driver for the HP Deskjet Plus, they say you should use the Laserjet driver. However, this does not support all the facilities of the Deskjet. Has anyone improved on this driver? Chris Bollard, Plymouth.

• **Maths Shareware** – The Maths disc, Shareware 25, seems to have been well received. However, more programs are being sent in. Is there demand for a second such disc? What sort of software would people like to see included? Brian Cowan.

• **Microsoft Word or Write** – Has anyone got any details of the format used by Microsoft Word or Write on a PC so I can convert from Archimedes format? BJ Edwards, Beaconsfield.

• **MS-DOS queries** – Is there anyone who considers themselves an 'expert' on using MS-DOS on the Archimedes who would have the time to answer queries sent in by letter to the Archive office? It would probably only be about one a week on average.

• **PC program to read DFS** – Does anyone know of a program on a PC which will read DFS discs? BJ Edwards, Beaconsfield.

• **Quattro data files with Schema** – Does anyone know how to translate Quattro data files into Lotus 123 format so that they can be copied into Schema? I have AsEasyAs, Twin and Symphony (which does produce Lotus format files) but have so far failed to load any Quattro files. Contact Michael Green, Fire Beacon Cottage, East Hill, Sidmouth, Devon, EX10 0ND.

Help offered

• **Digitisation** – If anyone wants artwork or VHS tape images digitised, let Ned Abell know on 02922–249. Prices would be by arrangement depending on what you wanted. A

Contact Box

• **Games Devotees** – If anyone is interested in an Archimedes games user club, send an S.A.E. to John Charman, 45 Smiths Lane, Fakenham, Norfolk, NR21 8LQ.

• **Southampton area** – Anyone interested in setting up an Archimedes Users' Group to exchange ideas, PD etc, please contact Dr Andrew Provan, 79 Roselands Gardens, Highfield, Southampton, SO2 1QJ.

• **Club BBC Archimedes de Paris** is a group of fifty Archimedes enthusiasts who meet every Friday afternoon from 6.30 p.m. to 8.30 p.m. at the following address (except during holidays): Ecole Superieure des Arts Appliques Duperré, 11 Rue du Petit Thouars, 75003 Paris. A

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Review of Version 1, Archive, November 1990

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Hints and Tips

• **ANSI C v3 on SCSI Hard Disc** – After some trial an error, I finally managed to install ANSI C v3 correctly on my new Oak SCSI card with 45M hard disc drive. Here's what I had to do:

First change line 3390 in the 'InstallNet' program which is on all three of the ANSI C discs so that it reads:

```
3390 DATA "ADFS::0.$","NET:$"
          ,"SCSI::SCSIDisc4.$"
```

Then run the "InstallHD" program from each disc and always answer 'Y' on the overwrite options (otherwise, the back up program would stop).

If you use the included !Cstart obey file, you should not '*Set Run$Path' in your !boot file and you should remember to modify the !Cstart file to work with SCSI and not ADFS i.e.

```
c$loc SCSI::4.$
```

Atle Baardholt, Norway

• **Deskjet Plus ink cartridges, recharging** – Further to Bill Graham's note in Archive 4.2 p8, I've found that Quinx Permanent Black works well and is probably cheaper than Art Pen Ink. You do need to be careful that you don't inject more ink than the sponge will absorb, otherwise the mess is dreadful! Stuart Bell, Brighton.

• **DropShip passwords** – Passwords for DropShip are Dahlia, Gaggle, Kaunda and Nautch.

• **ExAllPlus** – This is a non-Wimp program which was written in an attempt to catalogue my discs. It was designed for use with a single ADFS Floppy drive and a SCSI Hard disc together with a Star LC10 printer using continuous paper. Other printers may require some alteration to the coding.

Most existing "ExAll" and "CatAll" programs invoke the *EX and *CAT calls (!) which produce a lot of unnecessary and confusing duplication of libraries, directories etc. (I have memories of the reams of paper produced by an "ExAll" print-out of the original Archimedes Welcome disc.) To avoid this, these calls have been re-written so that, in addition to other changes, the directory headings have been reduced to path descriptions.

The program will produce both screen and printed listings of either the full disc or the root directory. The various options are selected by a series of key-strokes and a default screen "ExAll" routine has been set-up which can be easily customised.

Use can be made of the condensed print option to produce catalogue listings eight entries wide as against the usual five. This rather spoils the screen display in this mode but it was thought useful to maintain a check on the output to the printer. When using this option to produce "EX" listings the screen display is OK and the reverse feed facility of the Star LC10 enables double column print-outs to be obtained.

The "GetType" program is loaded in by the main "ExAllPlus" code and contains all the FileType codes I have been able to find but it can easily be updated.

(The listing is far too long to put in the magazine. I have put it on the monthly program disc. Ed.)

Doug Tuddenham

• **First Word Plus embedded commands** – If you switch off the Word Processor mode of FWP you can enter printer commands directly into the text. Double bracket command codes e.g. ((n))n1 can be entered to change the printer font and style. For example, with a Star LC24-200 in the following effects can be achieved:

Font	((F))0	Times Roman
	((F))1	Sans Serif
	((F))2	Courier
	((F))3	Prestige
	((F))4	Script
	((F))5	Draft
Size	((S))0	Standard

	((S))1	Double Width
	((S))2	Double Height
	((S))3	Double Width and Height
Colour	((C))0	Black
	((C))1	Red
	((C))2	Blue
	((C))3	Violet
	((C))4	Yellow
	((C))5	Orange
	((C))6	Green

Peter Thomas, Leics

• **FWP Cut and Paste** – It is possible to cut a marked block of text in a First Word Plus document and then paste it into another document. Both documents must be loaded first. This may be obvious but I have only just found out – the hard way. Dave Livsey, Devon

• **Impression hints & tips** – Now that I am using Impression for the magazine, there are likely to be a number of hints & tips forthcoming. Some of these may be obvious to the more experienced Impression users, but bear with me because some of us are only just beginning and, in fact, the experiences of someone just starting to use an application can often be very helpful to others going through the same hoop. Also, when you have been using an application for a while, you build up the feeling that you know how it works and there may be facilities which you never realised were available which new users pick up. Anyway, here are the first few...

Adding styles to titles – If you want to add a style to a title, be sure to select the whole line including the carriage return. In other words either put the cursor by the left hand margin and drag down to the next line or triple-click somewhere on the line. (I'm sure you all know that double-click selects a word, triple-click selects a line and quadruple-click (or <ctrl-@>) selects a whole paragraph.) The reason for selecting in this way is that if you only select by dragging across the line, you omit the carriage return which remains in the base style. The problem with this is that if, as in the title lines in Archive, the added style says "reduce the space after the paragraph to zero", the carriage return still has the full space-after-paragraph so the paragraph spacing remains unchanged.

Entering point sizes – If you want to change the size of some text, you mark it and press <shift-ctrl-S>. If the dialogue box is empty, you can type in a number, say 18, and it will assume you mean 18 point. If you decide that you want it a bit bigger and press <shift-ctrl-S> again, it comes up with "18pt" in the box. If you then type in, say, 2 <return> it will interpret the "18pt2" as (18+2)pt and will give you 20pt! (Well, it works in version 2.05.) Unfortunately, if you press <-> to try to put, say, -2, it seems to interpret it as an escape and closes the box.

Marking, deleting and re-typing – (This is something that is obvious to people coming to Impression via the Mac but may have been missed by people brought up through RISC-OS.) If some text is marked, by any means, and you want to replace it by some text you are about to type in, there is no need to delete the marked text first. As soon as you start to type, the marked text is deleted and transferred to the scrap-pad and your typing appears in place of it. The deleted text can be used elsewhere by pasting it in with <ctrl-V>.

Quick searching – If you want to find something quickly, find/replace is a good way to do it. Call it up with <ctrl-f4> and then, to delete the text already in the dialogue box, press <ctrl-U>, then type in the word you are looking for and press <return>. (This use of <ctrl-U> applies to all dialogue boxes – useful when saving a document under a new name.) Remember though that it searches from the cursor downwards, so add a <ctrl-uparrow> before calling up the find/replace box. (In the version I have, 2.05, the cursor is sometimes not re-displayed in its new position after a find/replace has been executed. In other words, it appears to be still where you left it but it may actually be further down the document so it's worth getting into the habit of using <ctrl-uparrow> anyway.) Also, don't get tripped up, as I just did. If you set the "case sensitive" option, it stays set until you switch it off again. So, if you can't find a word

that you **know** is in there somewhere, check that you have not left it in the case-sensitive mode from the last time you used it.

Replacing double spaces – I was trying to do a selective search and replace to remove double spaces and replace them with single spaces. When I told it to find the next one, it sometimes didn't appear to mark anything. Most peculiar! Eventually, I realised what was happening. The text was fully justified and the double spaces (the same would apply to finding single spaces) were between the last word on one line and the first on the next line. Thus Impression was marking the infinitesimally small space at the end of the line, i.e. was marking nothing at all. There's nothing you can do about it (apart from removing the full justification) but at least if you are aware of the problem, you won't be so baffled when it happens.

Searching for hyphens – In some versions of Impression, it is not possible to search and replace hyphens. I discovered this because, for ease of typing, I was using a double hyphen where I wanted a dash in the text, the idea being to replace them later. Impression refused to find any occurrences of hyphen-hyphen. Consultation with CC revealed that improvements in automatic hyphenation have resulted in this problem. The way round it is to search for `{\ 45}{\ 45}` and replace it with `{\153}`. Note the spaces after the backslash and before the 45.

Smart quotes – If you want smart quotes in a text, i.e. the curly ones instead of the straight ones on the key next to the return key, you can type them in using <ctrl-]> and <ctrl-\> for single quotes and <shift-ctrl-]> and <shift-ctrl-\> for double quotes. However, if you think that's a bit of a fag to remember, use the normal quotes and then, before printing, save the file (just in case of operator error!), save the text with styles (perhaps to a ram disc as it's only temporary), select the whole text (<ctrl-T>), delete it and finally drop the saved text back into the document. As the text is re-loaded, quotes are automatically 'smartened'.

Switching styles on and off – Those of you brought up in the Mac world may not have realised, as I didn't until today(!) that if you want something in, say, **bold**, all you have to do is press <f4> to switch it on, type in the bit that is to be in bold and then press <f4> again. Obvious? Yes, it may be to those of you who come new to Impression but for those of us steeped in Mac techniques, it comes as a welcome surprise.

If there are things about using Impression that 'came as a surprise' to you, send them in to us (preferably on disc) and we'll share them with other Impression users. We may even need an Impression Column.

• **Rotor and other games' passwords** – One way to obtain the Rotor passwords (and possibly other games) is to load each of the game's files into !Edit and use the 'Find' option to look for the first password. When the password is found, the remaining passwords should be in the next couple of lines. Andrew Campbell

• **Sony TV / Monitor** – I was told by Beebug that I couldn't use my Sony TV as a monitor with the A3000, but in fact this is quite easy to do. The sony TV requires a signal on pin 16 (blanking input) of the Scart plug, which can simply be connected to pin 20 (video input). Keith Raven, Slough

• **Z88 file transfer** – Here is a little utility for people who wish to transfer files from the Archimedes straight into suspended memory on the Z88. It saves having to break a file into smaller sections first and, of course, there is always a memory overhead in having at least part of the file held in the Z88 Filer. With this BASIC program, the filer is by-passed altogether.

```
10 REM >Suspender
20 REM Transfer file from Arc to
                Z88 suspended memory
30 REM ** IMPORTANT: Set z88
          receive baud rate at 2400
                        (in panel) **
40 *CAT
50 *FX 8,5
```

```
 60 INPUT "Send file? "file$
 70 *FX 3,119
 80 OSCLI("Type "+file$)
 90 FOR i%=1 TO 350
100 PRINT "#"
110 NEXT i% : REM these pad chars
  are need for certain types of file
120 *FX 3,0
```

To load a file into PipeDream, enter ":COM" as the "Name of file to load" in the files menu. Then run "Suspender" and immediately press <return> on the Z88. Finally, when the BASIC prompt reappears on the Archimedes screen, press <esc> on the Z88.

It is kinder to your disc drive to copy the target file into the Archimedes' RAM filing system first.

Jonathan Barnes, Watford

The following Hints and Tips come from Hugh Eagle of the West Sussex Archimedes User Group.

• **Disappearing paragraph spaces in FWP** – If, at the end of a paragraph, you type a space immediately before the carriage return, the carriage return will be deleted when you subsequently reformat the paragraph. Believe it or not, this is a "feature" of First Word Plus (documented in the version 1 manual on page 110)!

• **Loading sprite files** – When you double click on a sprite file icon, sometimes it is displayed at the bottom left-hand corner of a blank screen and sometimes in a !Paint window. This is because the action the computer takes when you try to "run" a sprite file depends on the contents of the system variable Alias$@RunType_FF9. This variable is defined by default, when the Archimedes is switched on, as "ScreenLoad %0". The effect of this is that when you double click on a sprite file (type &FF9) icon, the operating system executes the instruction

```
*ScreenLoad [filename]
```

This clears the screen and then displays the first sprite in the file at the graphics origin. However, when the Desktop Filer "sees" the !Paint application (i.e. when a directory window is opened in which !Paint is included) it runs the !Paint.!Boot file which, amongst other things, redefines Alias$@RunType_FF9 in such a way that when a sprite file is "run" the !Paint application is started up (that is if it is not already running) and the file is loaded in.

• **Listing the contents of your (hard) disk** – The operating system command "*Count :4.$.* RV" will catalogue the contents of the root directory and every sub-directory. As explained on pages 279/280 of the User Guide, the output from this command can be redirected to the printer by adapting the command to

```
*Count :4.$.* RV { > printer: }
```

Note: the spaces around the curly brackets and the > sign are important.

This method will redirect the output to the printer without displaying it on the screen. An alternative method will send all text that is displayed on the screen to the printer as well: first press <ctrl-B> (i.e. hold down the ctrl key and simultaneously type B), then issue the command "*Count :4.$.* RV" then, when the listing has finished, press <ctrl-C>.

• **Removing PCAccess** – The menu which appears when you click the menu button over any of the PCAccess icons on the icon bar has no Quit option and the application doesn't seem to appear in the Task Manager window. In fact, the application does appear in the Task Manager window – in the "Module Tasks" section. Clicking <menu> over the application's name there and moving to the Task 'PCAccess' submenu gives a "Quit" option.

• **Printing via a PC** – For some time I have been perplexed to find that when I try to print a file created by the Archimedes !PrinterLJ printer driver to a LaserJet printer attached to a PC, the printout stops part way down the page. At first I thought it must be because of limited memory in the printer so I tried creating the file at a lower print density but this made no difference to how much of the page was printed.

I think I have now hit on the answer, namely that, when using the MS-DOS Copy command

to print a file which includes control codes, it is a good idea to use the /b "switch", using the syntax:

```
copy [filename]/b LPT1
```

The insertion of /b after the filename causes MS-DOS to copy in "binary" mode: i.e. it copies as many bytes as there are in the file. Otherwise, in text mode, copying will continue only until the first end-of-file marker (Ctrl-Z or ASCII character 26) is reached whereupon it will stop. It is of course highly likely that a graphic printfile of many thousands of bytes will contain this character several times, so it is not surprising that only part of the page is printed!

• **Viewing !Draw files** – The standard way to view a draw file is to load it into !Draw. However, this has an irritating tendency to place the part of the picture you want to see outside the visible window. There are (at least) two convenient ways of avoiding this problem:

One is to load the file into the !Display application from Shareware 26. The other is to load it into an Impression frame (or, presumably, a frame in one of the other DTP applications). In either case, the drawing is scaled to fit the frame (the aspect ratio is preserved, so the picture fills either the height of the frame or the width). One advantage of Impression is that the frame can very easily be resized and the drawing thereby magnified; another is that it makes it very simple to display a number of drawings on a page and create an illustrated catalogue.

• **Floppy disc E format** – So far as I know, the detailed format of ADFS discs has not been published either in any of the manuals or in Archive. Having recently deleted some files by mistake and been forced into some detective work in order to recover them, I thought it might be helpful to write down what I have found out about "E" format floppy discs:–

With two sides, 80 tracks on each side, 5 sectors on each track, the disc has 800 sectors of 1024 (&400) bytes each. The sectors can be thought of as being numbered from 0 to 799 in the following order:

Track	Head	Sector
0	0	0
0	0	1
0	0	2
0	0	3
0	0	4
0	1	0
.	.	.
0	1	4
1	0	0
.	.	.
.	.	.
79	1	4

Each byte on the disc has a "disc address" equal to the sector number, as defined above, times &400 plus the number of bytes into the sector. Put it another way:

disc address = ((((track * 2) + head) * 5) + sector) * &400 + bytes into sector

Map format – The first two sectors on the disc contain duplicate copies of the disc map. The first 64 bytes of the map contain the following information:

byte 0 – a checksum byte

bytes 1/2 – the number of bits to the place in the map which marks the first free space on the disc, counting from the beginning of byte 1 (if there is no free space this number will be zero); the top bit of the 16 is always set, so, for instance, the value &8310 in these two bytes would indicate that the first free space in the map could be found &310 bits or &310 DIV 8 bytes from byte 1, i.e. at byte &63

byte 3 – &FF

bytes 4-35 – the "disc record" as described on pages 1012/3 of the PRM containing various details about the disc size, etc. which are the same on all "E" format discs, ending with the Disc ID at bytes 24/5 and the disc name from byte 26 to byte 35.

bytes 36-63 – reserved (all zero)

bytes 64-863 (800 bytes) – the actual disc map.

Each byte in the map represents one disc sector and the contents of the map indicate how the disc is divided up between the various objects (directories and files) on it. Each portion of the map is at least 2 bytes long, it begins with an identifying number (max. 15 bits), ends with a 1 in the top bit of the last byte and all the bits in between are zero. Thus, for instance, if the file with the identifying number 7 occupies 3 sectors the relevant portion of the map reads as follows:

first byte &07

next byte &00

last byte &80 (1 in the top bit)

The lowest identifying number is 2 and is reserved for the four sectors which are initialised when the disc is formatted and which comprise the two map sectors followed by the two sectors containing the root directory. Identifying numbers are then allocated, in order, as new objects are created.

A file may be fragmented into several pieces, in which case several portions of the map will contain the same identifying number.

The portions of the map indicating free space on the disc are linked together by a chain of pointers. As mentioned above, bytes 1 and 2, at the start of the map sector, point to the first free space in the map. At that point there is a similar pointer to the next free space (if any) and so on until the last free space is reached, where the pointer is zero.

A defective sector on the disc is identified in the map by number 1.

Directory structure – Each directory takes up two sectors. As mentioned above, the root directory occupies the third and fourth sectors on the disc (from disc address &800 to &FFF). Any sub-directory can be located by looking up the relevant entry in its parent directory, finding the identifying number (in the manner described below) and looking up the number in the disc map.

The first five bytes in a directory contain a checksum byte followed by the string "Nick". Then there are up to 77 entries of 26 bytes each representing the various objects (files and sub-directories) in the directory.

The format of each of these entries is:

bytes 0-9	name of file or sub-directory
bytes 10-13	load address
bytes 14-17	execution address
bytes 18-21	file length
byte 22	sector offset (see below)
bytes 23-24	identifying number as used in the map
byte 25	file attributes.

If the top 12 bits of the load address are all set (i.e. are &FFF) this means that the file is "stamped" and the remainder of the load and execution address fields are used to record the file type and date stamp as follows:

load address	FFFtttdd
execution address	dddddddd

(the bottom byte of the load address field being used for the top byte of the 5-byte format date and time record).

Note: in a disc sector editor which shows the bytes in order with the lowest byte of each word first, these 8 bytes will appear as

"dd tt Ft FF dd dd dd dd".

If not all the top 12 bits are set, the load and execution addresses will (as their names suggest) determine what the computer does when the file is *LOADed or *RUN (or double-clicked from the Desktop).

The sector offset in byte 22 is used where two files are mapped into the same portion of the disc. In such a case the files share the same identifying number (in bytes 23/4) but byte 22 indicates how many sectors into the portion each file starts.

A typical example of this would involve two small files each fitting into one disc sector (they might for instance be !Boot, !Run or !Sprites files within an application directory). Because

the minimum size of a map entry is 2 bytes representing 2 sectors on the disc, it would be inefficient to give each file a separate map entry, so the two files would be made to share. In this case, assuming the shared identifying number is say 8, bytes 23 and 24 of the directory entries for both files would be &08 and &00 but byte 22 would be &01 for the file that occupies the first sector and &02 for the second.

In the usual situation where a file has a map entry to itself, byte 22 is zero.

The bits of byte 25 (the file attributes byte) are used as follows:

bit 0 – object has read access for you

bit 1 – object has write access for you

bit 2 – undefined

bit 3 – object is locked against deletion

bit 4 – object has read access for others

bit 5 – object has write access for others

bit 6 – undefined

bit 7 – undefined

Bits 4 and 5 only have meaning to the network filing system. Bits 2, 6 and 7 should be set to zero.

General note: If you want to explore disc maps and directories it is very handy to have a disc sector editor such as the !DiscEdit application on Careware 2. Failing that it is reasonably easy to construct a program to read from a disc sector by sector (rather than file by file) and to display the contents. The key to such a program is the SWI call "ADFS_DiscOp". For instance, the BASIC instruction:

```
SYS "ADFS_DiscOp",0,1,address%
                    ,buffer%,length%
```

will read starting at the "disc address" (as defined above) given in the variable address%, the number of bytes given in length% (1024 for one sector) into the address in RAM stored in buffer%. Obviously, a certain amount of caution is advisable since a very similar command (replacng 1 with 2 for instance) could result in writing to and corrupting the contents of a disc. A

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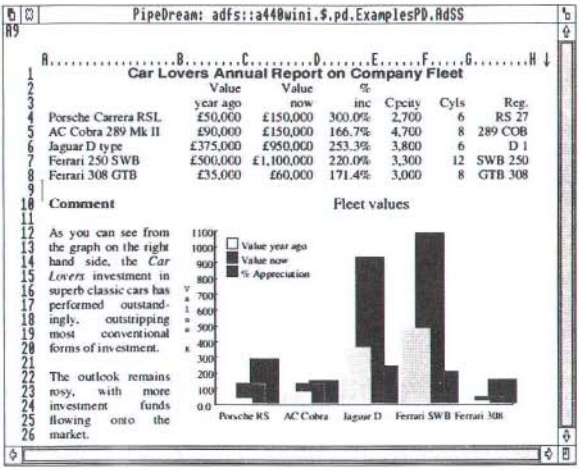

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Comment Column

• **RISC OS 2.01 and the A540** – Having had the opportunity to play with a working (!) A540, I have been able to compare the RISC-OS 2.01 machine with an A310 RISC-OS 2.00 machine. The first obvious difference between the ROMs is the addition of three new modules – IRQ Utils, Window Utils and ARM3 Support.

Of the 37 ROM modules now listed, 17 have been updated and 6 of these have had multiple updates. Interestingly, the new ROMs appears to be 15 bytes shorter than the old version. Obviously someone has spent a bit of time optimising code. I have not directly compared the *Help text to see if memory has been saved there, but it appears much as it always did.

Skimming through appendices to the various manuals, I note that provision is made to cater for a maximum of 8Mb of JEDEC type ROM and the board has numerous connectors for all kinds of goodies, such as genlocks, third party video attachments, etc. It must also be admitted that the new manuals seem to be a great advance on some of their predecessors and give a lot of good information. The section dealing with monitor support is a real eye-opener: absolutely full connector diagrams and hints. It would be fascinating to get a glimpse of the new A540 technical Reference Manual when it sees the light of day – what clues to future developments must be contained with its cover!

It is very hard to be objective but the whole feel of the A540 is very good – as it ought to be at the price – and the speed is obviously a whole new dimension. The only quibble I have is the noise of the two fans – perhaps someone could produce a Lancaster Flight Simulator to capitalise on the racket!

John Fidler, Isle of Wight

• **Clares/EMR clash?** – In response to D Hill (Archive 4.3 p 16) who had problems with EMR's Midi podule and Clares' Armadeus... I had similar problems – a lot of software will not 'recognise' the EMR Midi board. On ringing EMR, I was told quite the opposite regarding EMR policy as regards Acorn Guidelines. They admit that their boards **are not guaranteed** to conform with Acorn protocol and that to assist with compatibility, they sell a piece of software for £6.95 to make it work! What a nerve to charge money for this software, especially when, before buying this EMR Midi 4 board, I was told over the telephone that the boards would work with all Midi software.

Leslie Hay, Kincardineshire.

• **Converting Archimedes programs to DOS machines** – "I think that it is not generally known that BBC BASIC is available as a program to run under MS-DOS. At first this may not seem too brilliant an idea for Archimedes' users, but it can be for those wishing to write assembly language as the built-in assembler is an 8086 one and works just the same as the other Acorn assemblers we have all grown to love (?). In addition of course it means that (some of) one's BBC/Archimedes BASIC software can be made to run on a normal DOS machine.

Writing 8086 assembly language will no doubt be seen by many as a backward step, but there is no denying the popularity of machines using this family of processors.

John Waterman, Kent

• **A Joystick Adaptor** – The Serial Port's gadget is packed into a neat box with Archimedes and printer sockets at the ends, two joystick D9's and a printer / games switch on the top. The package is supplied with two programs which allow you to define the effect of the joystick actions. Their 'Tutor' program prompts for stick actions and a matching key stroke, with which it makes a command file for the joystick Rmodule – my early version lacked <Shift>, <Ctrl> and <Shift><Ctrl> functions. Alternatively, their 'Compiler' program can be

used to convert text files with simple keywords for stick actions, flags and logic to produce a similar command file. Example files were included with the package and included most games. Price £23.95.

Nick Kelly, Liverpool

• **ARM3's** – In November, Watford Electronics said that they had such big stocks of ARM3 chips and that they were not worried that the latest batches would not run at 30MHz. In the February editions of some BBC/Archimedes magazines, Watford are listing 20MHz ARM3 upgrades at £50 less than the 30MHz upgrade. Hmm.... Stuart Bell, Brighton.

• **More on ARM3's** – Aleph One, makers of the original ARM3 upgrade write...

The performance enhancement of an Archimedes using an ARM3 upgrade, compared to the native ARM2, is strongly dependent on the screen mode and somewhat dependent on the actual task.

It is also dependent on the clock speed, but only weakly so in the range of interest. For example, the 4.3% drop in clock speed from 30 MHz to 28.75 MHz produces only a 2.4% drop in the speed of the "Whetstones" test and only 1.5% in the "Dhrystones" test and only 0.7% in the "Megaflops" test. Changing mode from the lower modes to some of the higher ones can, by contrast, produce a change of 9% to 14% in speed. Since the effect of having an ARM3 at all is to multiply the speed of the machine by factors of from 3 to 6, the impairment due to a clock speed of less than 30 MHz is tiny in comparison and not detectable by the user.

In future, we shall make no specific claim as to the clock speed of our ARM3 upgrades except that it will not be less than 24 MHz. In practice, we are at present shipping upgrades running at 28.75 MHz.

• **IBM versus Archimedes** – The best reason for buying an Acorn Archimedes is because you want to own an Acorn Archimedes! If someone wants to own an IBM PC or a computer that will run IBM PC software then I would always recommend them to buy an IBM PC.

I have always told my friends and colleagues that there are two types of people who buy a computer to use at home. There are those people who are primarily going to buy (or acquire!!) ready made software and use it, and there are those who are mainly interested in writing programs. The former can do no better than buy an IBM PC because there is so much software available for them (of course much of it is in the £400 to £500 price bracket).

The other type of purchaser would need his head examined if he choses a PC!! I say this with some feeling because I spend my working life programming PC's to support the hardware that I design and I am constantly amazed at the inconsistencies and peculiarities that exist within the IBM DOS and BIOS. It just shows the power of IBM that they can foist such a dog's breakfast on the world and force it to become a standard. Later versions and 386/486 machines aren't really helped that much because they have to maintain compatibility with the earlier versions.

From a programmer's point of view, I find the Acorn machines (BBC B onwards) the best thought out and most consistent programmer interface, with the desktop providing a consistent user interface. I think the bulletin boards show how it is relatively easy to produce a Desktop Utility, judging by the number they have for downloading, this certainly can't be said for Gem or Windows based utilities.

All I am really trying to say to Michael Green is that all his complaints seem to be on the IBM PC side of things so why doesn't he buy a PC to run his PC software on, but if he wants to program it, I can guarantee him plenty of head scratching and sleepless nights. Try using a bulletin board to get in touch with someone who designed your PC and try to get him to answer technical questions about the operating system!

Philip Jones, Clapton.

• **IDE drives** – I purchased an IDE 80M drive, controller etc, for an A310 from the Computer Shopper Show. Upon returning home, I was very impressed at the amount of packaging used to protect the mechanism.

I found the installation very straight-forward and the instructions more than adequate, although the point about a link having to be removed if the interface is to be used without a backplane (as I am) should have been emphasised a lot more, as I believe that not doing so will destroy the interface. Installation took me around a quarter of an hour from removing the cover of the computer, to replacing it. My only disappointment is that the fan is quite loud!

I would also like to congratulate Mr. Copestake on his service, as a few days after I started using my drive, a fault developed which rendered my drive useless. I made one phone call (to an answer machine) which was very promptly returned and, after an explanation of the fault, a new drive was dispatched to me, which I received the next day, along with a very apologetic letter and instructions to call him again once I was satisfied that the new drive was OK, in order for him to arrange collection of the faulty one.

This is what I call service – congratulations Ian Copestake Software.

The drives come formatted with a few utilities on them: A formatting program, a program to create a PC partition, one to identify the mechanism and return the number of cylinders, sectors etc., and a test program which performs speed tests and allows comparison with other mechanisms. My only complaint here is that the test program will not work in 1 Mbyte, even though the Help file says otherwise. I managed to get it to work by completely re-configuring my machine and running it from the supervisor. My drive is rated by ICS at 19ms – this program returned an average value of 21.3ms, a track to track time of 6.1ms and a transfer rate of 460 Kbytes/sec in mode 12 peaking at 740 Kbytes/sec. How do these figures compare?*

Overall, I am very impressed with this product, and would recommend them to anybody who either doesn't need the extra speed and expandability that SCSI devices offer or for those who, like me, are working to a smaller budget.

I F Rhodes, Wolverhampton.

**The speed of an Oak 80M SCSI drive is 660 Kbytes/second in mode 12 and a 42M removable runs at 590 Kbytes/sec. Ed.*

• **Jiglet in Use** – Having reviewed Jiglet prior to using it in a classroom situation, I feel that some comments regarding its use are now in order. Most groups of pupils with whom the program has been used were experiencing the WIMP environment on the Archimedes/A3000 for the first time. In an attempt to provide pupils with the I.T. skills they will need in the compulsory subject areas (to satisfy National Curriculum and provide them with a good range of skills) all 11/12 year old pupils follow an introductory course involving the main software applications. The use of Jiglet in this course was a deliberate ploy following discussion with an I.T. colleague. The operation of the program entails using several standard RISC-OS techniques, i.e. installing on the icon bar and dragging in files (Jiglets) which we considered worthwhile.

The program was introduced in the second lesson – following an introduction to the A3000 and some of the sample applications on Applications Disc 2. The double click of <select> to install (load) the program and the dragging down of a Jiglet file were accomplished with a minimum of fuss by all. The well designed main window (front end – if you prefer jargon) was easy for the pupils to understand. They soon picked up how to set the options they required, change shape, number of pieces and rotation. Once into New Jiglet, swapping between selecting a piece of screen and placing a piece of screen caused a little confusion for some. This mix up between pressing <select> or <menu> and the associated problems of no piece to place or returning to choose another

piece before placing the previous one were overcome by even the least able after a few minutes use. Calling the mouse buttons by the RISC-OS names of 'select', 'menu' and 'adjust' is probably preferable to left, middle and right not only because of the RISC-OS conventions but for those pupils who do not know left from right!

Completing the pictures was not a substantial problem for most of the 11/12 year olds. At the most difficult level, with the pieces rotated, several of the pictures are a challenge requiring careful thought. As a test of 'spatial' ability, the program is much more suitable for primary school children. This has been confirmed by a friend who, after being shown the program, immediately persuaded his Headteacher to purchase it. The primary school children are reported to be enthralled by this program. They have the expected increased difficulty in completing some of the Jiglets. The highest level of difficulty did indeed provide a challenge for some less able 16 year olds I found myself supervising during the absence of a colleague – they enjoyed it once they had mastered the operation of the mouse.

Jiglet is not used as an introduction to the A3000 in the primary school but as a resource in topic work. The children create a picture relevant to their topic using an art package, save this as a sprite and then transfer it to Jiglet. From here it may be completed by other members of the class; the alternative being to print it out and, using the facility to print a blank Jiglet, turn it into a paper based jigsaw. Indeed this ability to transfer sprites has been used with the 11/12 year olds. Following their experience of an art package (the excellent Flare) they are given the task of producing a picture suitable for turning into a Jiglet. The variety and standard of pictures produced by all ability levels with the motivation of others completing their Jiglet is outstanding.

Using this program as part of the introduction to using the A3000 has given the pupils enjoyment as well as providing varied learning situations/ experiences. It has, owing to the nature of RISC-OS, also enabled the integrating of applications. This program has been a useful acquisition and 4mation's policy of including a site licence in the price makes the program so much more useful. Roger Nelson, Durham. A

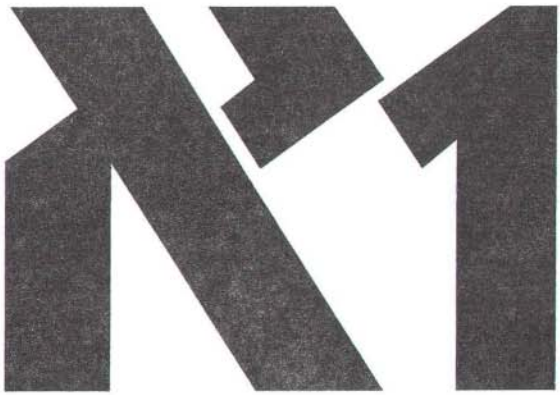
Matters Arising

• **!ChartDraw and !KeyStrip** (on Careware 5) have been considerably improved by the author Dr Chris Johnson. You can upgrade your original by sending Chris a blank formatted disc and the return postage. His address can be found in the 'ReadMe' file of both applications.

• **Using !Draw1½ on Shareware 34** – Some people have found that the !Draw1½ application on the Shareware 34 disc sometimes fails with a 'Fatal error internal type 3'. This is because the floating point emulator module must be loaded before running !Draw1½ (this module can be found in the 'Modules' directory of Applications Disc Two). The run file didn't include a reference to the FPEmulator module as the exact location of the module may not be relied on. However, if you wish you can put the module in the '!System.Modules' directory and add the following lines (after the line that reads RMEnusre Shared CLib, etc) to the !Run file using !Edit:

```
RMEnsure 2.80 Load System
            .Modules.FPEmulator
RMEnsure 2.80 Error 0
         FPEmulator not found
```

A



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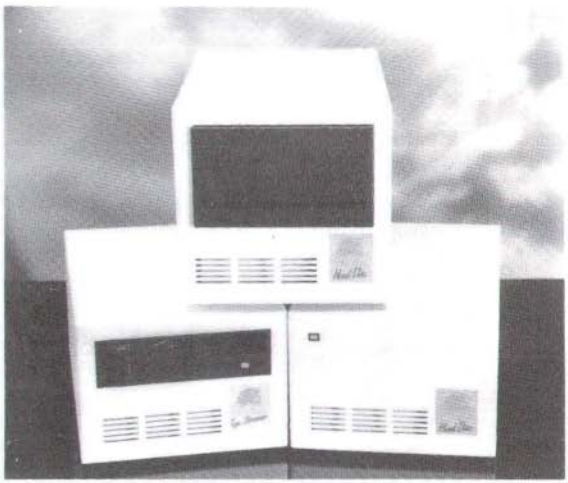

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Hardware Column

Brian Cowan

I have been delving into the inside of my new Archimedes A540, primarily in order to install an external floppy disc drive but I thought I would fill you in on my observations.

Beefy power supply

A complaint I have heard against the 540 is its noise. The machine has a hefty great power supply which fits down most of the left hand side of the machine, and it incorporates *two* fans. These are the source of the noise. The fan filter extends down the entire left side of the PSU. At last Acorn have provided a power supply capable of supporting some greedy expansion cards. Personally, I am not disturbed too much by the noise. In the past I have had aged hard disc drives making more noise. That was distressing but, by comparison, this is soothing.

Lithium cell

Out goes the battery of two alkali cells, and in its place is a lithium cell, as in the A3000. I must find out about the lifetime of these, as replacement does not seem trivial. I have just changed the alkali cells on a batch of older Archimedes, having learned the hard way of the perils of forgetful CMOS RAM. I am sure it makes sense to go for lithium cells, but I am reminded of that early batch of BBC Masters whose lithium cells started exploding – but Acorn have presumably solved that little problem!

RISC-OS ROMs

The four ROMs in the 540 are located under the back of the hard disc drive. This makes it slightly inconvenient to replace them, but presumably they will not be changed too often. In my 540, they are actually EPROMs in anticipation, I assume, of RISC-OS version three. A brief note tells me that my 540 contains RISC-OS version 2.01. This is essentially the old version (2.00) of the operating system, with some additions to support the new hardware in the machine.

Extended RAM

RAM configurations of 4, 8, 12 and 16 Mbytes are catered for automatically. However this does not extend to the PC emulator. To use this in a machine with greater than 4 Mbytes of RAM, you need a "patch" available from Acorn. The problem is that the emulator does not support MEMC chips working in the master/slave configuration.

Cache control

There are two star commands relating to the ARM3 processor. These are *cacheon and *cacheoff, just as with the Aleph One ARM3 upgrade. Their functions should be self explanatory. Unfortunately, I have not ascertained whether the 540 also permits flushing of the cache although I have had no cause to use this.

Modes

Finally, there are some new screen modes available to support VGA and Super VGA. This sounds good in theory, but with such monitors you can't use most of the old Archimedes modes. Fortunately help is at hand with the Atomwide video support utility; with these monitors you can't really do with out it. (The A540 Utilities Disc is available for £5 from Atomwide.)

Circuit board

It is noticeable that the circuit board is very densely populated – much more so than the previous machines. There is an abundance of surface mounted resistors and capacitors, although no semiconductors, so far as I can see. The ARM family chip set are mounted in sockets (except for the ARM3 itself which is mounted on its own board) and there are some PALs, also in sockets. Sockets are reassuring to those thinking of the future, although of course the most direct expansion route will be the three RAM board sockets. There is space for the Econet board, just as on the previous models and it uses exactly the same Econet module as the Master and the ordinary Archimedes.

Floppy disc drives

The reason I dismantled the machine was to install an external floppy disc drive. I still have some software, particularly DOS programs, on 5¼ inch discs. Unfortunately, I was in for a surprise. Although the internal floppy disc drive is mounted in a similar place, in a similar way, the connectors on the circuit board are positioned differently. The signal and the power sockets are mounted right at the front of the circuit board, under the drive support "bridge". So to get to the sockets, in order to install an extended connector, would involve the removal of the circuit board from the case. Also, the sort of extension connector used for external drives on the 300 and 400 series would not fit anyway.

The simplest way of connecting an external drive is to tee in at the connector to the internal drive. You need a ribbon cable about half a metre long with a plug and a socket at one end spaced about two centimetres apart. If the plug into the drive is pulled out, it can be inserted into the socket on the extension lead, and the lead's plug fitted into the drive socket. A connector at the other end will attach to the external drive. Note that on these machines there is no reversing of connections as on the older models. If there are any loading pro'ems then all you need to do is to remove the termination resistors on the external drive. Also remember that you might need to change the configured step time for the external drive if it is one of the older, slower drives.

Archimedes portable?

There has been some speculation in the press about the possible appearance of a portable Archimedes computer. There are rumours of three ARM based portables under development. Archimedes guru Mike Harrison, of White Wing Logic, has been exploring the feasibility of producing a portable based on an A3000 board. This has the advantage that most of the circuitry is already present, including the RISC-OS ROMs. A smaller keyboard would have to be found, and a suitable LCD screen. Also, there would have to be power saving circuitry to enable battery operation for any reasonable length of time. Acorn are also said to be working on a portable Archimedes, although in the utmost secrecy. I am not sure what market Acorn are aiming for, but presumably they have their eye on education. If this is so, I am sure that a monochrome screen would not be terribly popular but a colour LCD display of any appreciable size would be prohibitively expensive. We will have to wait and see.

Apparently, it seems there might be a third ARM based portable under development by ex-Acorn Herman Hauser, now of the Electric Book Company. However, it is not clear if such a machine would contain RISC-OS. It is known that Acorn are not happy about licensing the Archimedes operating system to third parties, and this computer would probably be aimed at some quite specific application. In fact, it might even be that Hauser's machine and the Acorn portable are based on the same hardware, simply using different operating systems.

My worry about these portable projects is that since we are becoming spoilt by larger capacity hard discs, ARM3 CPUs and bigger and better high resolution colour monitors, a basic model portable might be something of a disappointment.

Oak apples

Acorn have joined with Apple and VLSI Technology (the manufacturers of the ARM chip set) to establish a new company called Advanced Risc Machines Ltd. The tie-up with Apple is intriguing. There is already an ARM based graphics accelerator for the Mac and there are whispers that the Mac operating system has been translated into ARM code. If this sees the light of day then it might well be in the guise of a portable Mac. However, my own view is that since the advent of Impression II, there is no need for Archimedes owners to think enviously about Macs! (See Ed's comments in the Comment Column.)

There is news of an ARM600 CPU chip being developed by this company. Information is scant at the moment, but it sounds exciting.

Mike Hobart adds... Unofficial sources say that ARM4 may be renamed to make it sound more upmarket! They also say it will come as a package with 4Mb RAM. I guess it will not mostly be on-chip, but I also guess that the FPU and MEMC will be. I believe that a new version of VIDC is under development, which will offer a much larger range of greys. It is also said that the provisions for parallel processing which are already available in ARM3 (see RISC-User July/August 1989) will be used in the new ARM4 systems. There are said to be testbed machines with several ARM4s all under the command of a supervisor ARM4, which presumably handles I/O. The result is not slow! I also hear that a MAC emulator exists and impressed Apple. No news on availability. A

Small Ads

• **A3000 1Mb RAM board** (upgradable to 4Mb) £60. Phone (Derby) 0332–701969.

• **A3000 with 2Mb**, 2 mice, BASIC Guide, Assy Lang book, much software + 25 blank discs £700 ono. Simon on 0954–719578 after 6.

• **A310 base** £400. David Howe on 0255–431604 (evenings).

• **A310** with twin drives, colour monitor & software £600. Phone 0743–248107.

• **Acorn DTP** £40, FWPlus1 £20, Software Developer's Toolbox £40, System Delta Plus £20. (A donation of £5 will be made to Committee to Stop War in Gulf for each item sold.) Miles Sabin 081–980–2455.

• **Apocalypse** £10, Interdictor (1) £10, Conqueror £8, CIS Minipack 5 (Fish, Fireball 2, Pon) £16, Render Bender £35, Nevryon £10, Pacmania £4. Ring Mark on 0285–654346 evenings.

• **Capsoft Disc N°1** – drawn fonts, borders, frames etc. Send £6 to B.J.Thompson, 8 Oldgate Avenue, Weston-on-Trent, Derbyshire, DE7 2BZ.

• **Colour Digitising** – up to A4 size. Phone Ken Warwick on 081–500–5701.

• **Digitisation** – Artwork or VHS tape images digitised, call Ned Abell on 02922–249. Prices by arrangement.

• **Epson GQ3500** 2Mb memory, 3 toner cartridges, HP Laserjet emulation, 8 downloadable fonts £600. T.Medhurst 0380–818441 ext 228.

• **Epson LQ2500** hardly used, 2 new ribbons £425 ono. Phone Rudi on 081–967–4401.

• **FWPlus1** £30, First fonts (Maths Phys) for Star LC10 £15. Ring 0925–811420.

• **Home for much loved Archimedes required** – Perfect A440 colour £1500. Phone Roger 081–767–8684 (7.30 p.m. to 8.30 p.m.).

• **MEMC 1a** £54, 514256 80ns memory chips £5 each, PC Emulator v1.33 £50, Apocalypse £12, Hoverbod £5, Pacmania £5, Quazer £5, Startrader £5, Terramex £7, Watford's 5.25" disc buffer for A300/400 series £12. New KXP-1124 printer ribbon £8. Richard Cheung on 081–206–2324.

• **Micro Peripherals MP165** NLQ printer, hardly used £100. Phone Vincent on 05086–3517 (near Norwich).

• **Ram 62256 LP10**. Two for £16. Phone Les on 0202–529787 (p.m.) for availability.

• **Tracker** £25, SoundSynth £20, Render Bender £30, Arthur PRM's £10, Terramex £4, Word Up/Word Down £4, Nevryon £8, Hostages £8 (new). Contact Jeremy Mears on 0242–521050.

• **Viewstore** £15, Logistix £35, Sony 3.5" drive + dual slot fascia £75, WWPlus £15, ANSI 'C' £15, 27128 EPROMs (12.5V) £3 each. All prices o.n.o. Phone 0234–856070.

• **Wimp based address book** and 700k of PD software. Send £1, blank formatted disk and S.A.E. to M Pargeter, 1 The Ridgeway, Hitchin, Herts, SG5 2BT.

• **Wanted** – Impression and Poster. Phone 0332–701969.

• **Z88 with 256Kb** extra RAM, power supply, Archimedes link, utility disc, all manuals. £200. Call Jonathan Barnes on Watford (0923) 224560.

Charity Sales – The following items are available for sale in aid of charity. PLEASE do not just send money – ring us on 0603–766592 to check if the items are still available. Thank you.

(If you have unwanted software or hardware for Archimedes computers, please send it in to the Archive office. If you have larger items where post would be expensive, just send us details of the item(s) and how the purchaser can get hold of them.)

Trivial Pursuit £9, Acorn ROM/RAM podule £18, StarTrader £5, Quazer £3, Minerva's Sales, Nominal, Purchase Ledgers and Order Processing and Invoicing, full manuals, £35 the lot, Interdictor 1 £6, Holed Out £8, Corruption £3, CIS Utilities £5, Brother HR15 + 6 daisy wheels £60 (buyer collects from Fleet, Hants), Logistix 2 (brand new) £40, Artisan Support Disc £2, Front Fascia for single drive A310 £5. A

Competition Corner

Colin Singleton

This month's puzzle is for Mastermind enthusiasts. I don't mean Magnus Magnusson. I mean that game which was all the rage a few years ago, played on small plastic peg-boards. We used to play it in our coffee breaks using pencil and paper, long before the commercial version appeared. I will describe our version.

One player thinks of a secret four digit number (leading zeros are permitted) and the other has to deduce it by intelligent guesswork. Each guess must be a four digit number, and the first player awards a score to each guess.

The score is in two parts. The first indicates the number of digits in the guess which are also in the secret number. The second indicates how many of these are in the correct position in the number. Note that if a digit occurs more than once in either the guess or the target, there must also be duplicates in the other number for both (or all) to count in the first part of the score. Thus if the target is 0112, a guess of 1234 earns a score of 2 & 0. A guess of 1122 scores 3 & 2.

The second player must find the secret number (which scores 4 & 4) in the fewest guesses.

What should the first guess be? Whatever your guess, there are, in general, fourteen possible scores. When you are told the score for your guess, you can then reduce the initial 10000 possible numbers to a much shorter list. I believe the best strategy is to offer the number which, if it earns the score which still leaves the longest list of possibilities, ensures that that list is as short as possible.

What is that number? There are several answers, please find the numerically smallest.

Assume then that you continue to follow this strategy, always offering the guess which will minimise the list of possibilities for the worst-case score (always offering the smallest number where there is a choice). If you are unlucky enough to be given the worst score every time (the one which leaves the largest number of possibilities), what is the sequence of guesses, and what is the secret number?

Entries and comments please either to Paul at N.C.S. or direct to me at 41 St Quentin Drive, Sheffield S17 4PN.

Any volunteers for the word version? The target, and every guess, must be an English five-letter word. Not so easy!

The October (Bingo) competition, regrettably, is cancelled for lack of interest. The winner for November (Seven Dwarfs) will be announced next month. A

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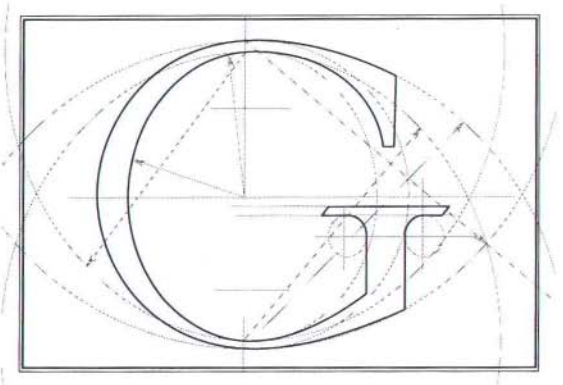

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IFEL A310 4M Upgrade

Stuart A Bell

At 11.07 a.m. on Tuesday morning, the courier collected my Archimedes A310. Less than 48 hours later, it returned, having completed a round trip of about 500 miles. More importantly, it now had 3M more memory, my credit card having been debited by £399.

In the beginning

When I bought my A310 three years ago, 1M had seemed an awful lot – I'd tried to buy a 305, but the dealer had persuaded me to go for the full 1M. Since then I'd bought Impression, which works perfectly well in 1M, but even more nicely with a great big font cache and multi-tasked with FontFX and Draw. I wanted more memory, but held back when I saw the prices!

CJE were perhaps first in the field, with an approach that involved significant work on the main Archimedes board. Later, Atomwide, Computerware, Protokote and Watford joined in, all using a less invasive installation method that requires the temporary removal of the MEMC device and either the VIDC or the RISC-OS ROM chips. (See the comparative review 'A310 Memory Upgrades' in Archive 3.10). For a while, I toyed with the DIY upgrade by Willi Langhans mentioned in Archive, but knew that my electronics skills weren't really up to it.

The IFEL board

In Archive 4.1, I first saw the advert for the IFEL board. It quoted £499 inc VAT fully fitted, and mentioned the option of DIY fitting. (A 2M version is also available – for simplicity that will be ignored in this review.) A phone call confirmed a DIY price of £399 and arranged for the sending of literature.

IFEL have followed the CJE approach, in that chips have to be removed from the main board, and a new board plugged into sockets where the chips were. However, IFEL have reduced the 'chips-to-be-removed' count from nine to three, at the expense of an extra line to the MEMC and the moving of the ends of thirty-two resistors from the original RAM to the new RAM board. This board sits under the disc-drive support bar, above the original memory, well clear of the ARM device. Benefitting from being a recent design, it uses only eight memory chips, namely 1M x 4 dynamic RAMs.

In December, further literature from IFEL showed that the DIY price had dropped to £349, whilst the fitted price (still £499) included either a free MEMC1a or a free podule backplane. The detailed installation instructions showed that the chips to be removed need only be cut out, and so I arranged with a friend who is rather more adept with a soldering iron to help me with the upgrade.

Telephoning IFEL in mid-January produced the news that the fitted price had come down to £399 inc VAT, including courier collection and delivery. Since IFEL can offer a guarantee with a fitted board that they couldn't possibly offer for DIY installations, I ordered one immediately. The machine was picked up the following morning... which is where we came in.

From a hardware point of view, one *almost* has to accept IFEL's word that they've done the upgrade, so neatly does the board hide away. ARM3 upgrades should be no problem. In my order to IFEL, I'd said, 'I can't really expect that the free MEMC1a offer is still on, but if it is, I'll have one, please.' Yes, sure enough, when the Archimedes came back, there was a MEMC1a in place. Also, IFEL had put in a more recent version of the ROM on my Oak SCSI board, entirely free of charge!

I do have one small complaint – after all, this is supposed to be a review and not an advert. When my machine was reassembled, the self-tapping screws that hold down my SCSI drive were left very loose, so that the drive rocked on the support bar. The consequences of travel in

that state just might have caused damage but, thankfully, it didn't.

The competition

Looking at the headings under which Paul discussed the Watford, Protokote and Computerware boards in his original review, we can draw the following observations:

ARM3 compatibility. As noted above, this should be no problem – but it's always best to check first. Certainly, the board is clear of the ARM and MEMC – and also the VIDC, should you want to install Atomwide's VIDC enhancer.

Quality of Construction. From what one can see of the board – and of the photos in the literature – the board is well made. The soldering is very neat, with no massive headers and connectors, there should be no problems with reliability or loose contacts.

Fitting. The DIY option is there for the very competent electronics expert, but is it worth saving £50? At 47½ hours for the Brighton-Cornwall round trip, there can be no complaints about turn-around time.

Upgrading. IFEL do offer a 2M version of the board. Upgrading requires removal of the sixteen devices used on the 2M board and replacement with the eight larger chips. Obviously, IFEL will give a price for an upgrade. However, standard RAMs are used and no other components are needed, so a DIY upgrade is possible, However, if funds permit, starting with 4M will be cheaper in the long-term.

Price. Scanning the pages of magazines show that current prices are typically as follows: (all prices inc VAT and P&P)

IFEL	£399
CJE (Beebug)	£519
Computerware (Archive)	£540*
Atomwide (Copestake)	£574
??? (Technomatic)	£598
Protokote (Archive)	£600*

(*Note that Archive no longer supply A310 memory upgrades – I have simply used the old prices for comparison.)

Availability. As I'm writing this three days after placing the order, it would seem to be no problem. IFEL apparently bought a large stock of the 1M x 4 devices, which should ensure availability and, hopefully, some immunity from the RAM price increases to which Paul referred in the editorial of Archive 4.4. As always, though, check before ordering.

Conclusions. On the day my machine came back, I'm very impressed and I can't see why I won't continue to be. In comparison with the plug-in designs, down-grading to 1M would be rather more difficult, but not impossible. On the other hand, IFEL claim that reliability with soldered-in designs should be better than those using headers and ribbon cables. At the price, and with the service that I experienced, it seems a highly competitive product. Most importantly, it opens up a whole new world of Impression II with a 500 Kbyte font cache, memory intensive screen modes and the multi-tasking of several large applications, thus enjoying the full power of RISC-OS for the first time.

Steve Picton of IFEL comments... The question of the loose disc drive screws is something of a mystery. The main A310 circuit board can be both removed from and put back into the casing with all the disc drives in place. This is true even with the RAM board in position and so there would have been no need to adjust the securing screws. However, we generally like to check things other than the RAM itself – a new fan filter for instance – so I must concede that this is something which should have been spotted.

As regards the new version of the Oak software, I should point out that the update was not the latest version referred to in Archive 4.3.15. A charge of about £10 is made for this. It was simply a change from version 1.03 to 1.04, which was known to fix the bug causing problems with certain icons. Obviously we have Oak's permission to do this. *(The really new version of Oak software mentioned two months ago now as being ready, is still, unfortunately not ready. Ed.)* A

Archimedes Memory Upgrades

4Mb of RAM for your A310 or A305 is now only £399 inc. VAT/fitting

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2Mb (total), £69. Upgradable to 4Mb.
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A data sheet is available for these upgrades. This explains the type of chips needed for the "bare board", which has high quality sockets for the RAM chips. Only 8 devices are required.

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Impression 2

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The small size of the board even allows an 8Mb upgrade to be fitted - the A380? This would be impossible with other RAM expansions. Our information pack gives further details.

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Software for

ShowPage

ShowPage is a PostScript compatible interpreter running under RISC OS.

Over the last 6 years PostScript has established itself as an industry standard graphics programming language. Pioneered by Adobe for use in the original Apple laser printers, it is now used in all manner of output devices such as colour printers, and typesetting machines.

ShowPage will be attractive to those wanting to learn and explore this programming language and those wanting to print and use PostScript files from other machines.

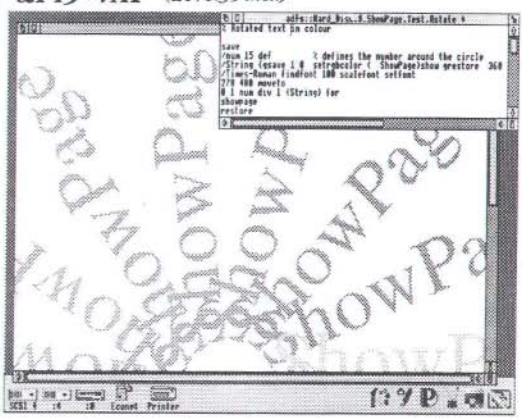
ShowPage is fully multi-tasking and RISC OS compatible. It can read any PostScript file and output either to a window on screen, or to the currently selected RISC OS printer. It can therefore be used to make even the lowest cost dot-matrix printer PostScript compatible. When used in conjunction with LaserDirect, it can turn this printer into a very fast and fully fledged PostScript compatible laser printer.

ShowPage supports the colour extensions and can create a sprite file of any required size. It can therefore be used to incorporate PostScript graphics into other RISC OS applications. It uses the RISC OS outline fonts, rather than the conventional PostScript fonts, for all rendering, so it is compatible with the wide range of Archimedes outline fonts now available for this computer.

ShowPage has a simple built in editor allowing PostScript programs to be entered directly, and interactively with the results shown on screen in another window.

Showpage is compatible with the output from Acorn PostScript printer drivers. Minimum recommended memory is 2Mbytes.

£149+VAT *(£171.35 incl.)*



Package includes a spiral bound manual detailing the ShowPage version of the language. 320 page PostScript language reference manual by Adobe. 240 page PostScript language tutorial manual by Adobe. Discs containing ShowPage and example programs. AvantG, BookM, Pembroke RISC OS outline fonts.

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the Archimedes

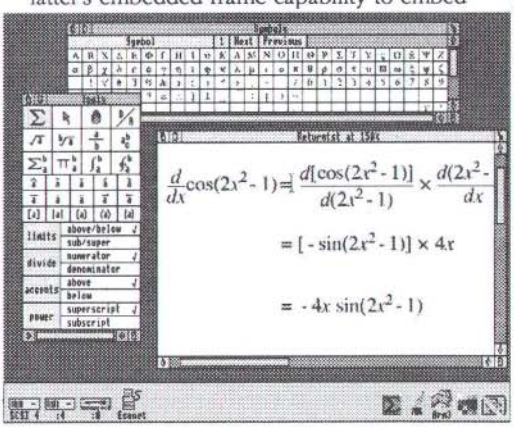
An equation building tool that complements many RISC OS applications, in particular DTP and word processor programs such as Impression and Impression Junior.

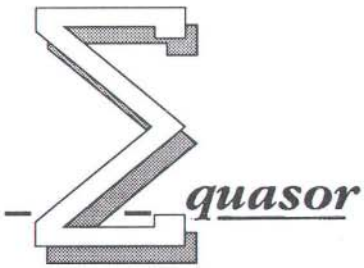
Many users of the Archimedes have a need to include complex mathematical formulae or equations into documents. Equasor allows equations to be built up on screen, graphically, from their component parts. Using the Acorn outline font system it presents a totally accurate view of the final equation at all times.

It simplifies the building of equations by presenting palettes of symbols, functions and operators which can be selected just by clicking with the mouse. It intelligently scales and re-sizes features such as summation symbols, brackets, and square roots as the equation is edited so they are always the right size.

Once the equation has been created it can be saved or exported to any number of compatible RISC OS applications. In DTP packages it can be dropped into frames just like any other drawing where it can then be scaled and positioned as required.

When used in conjunction with Impression II, it can take advantage of the latter's embedded frame capability to embed equations into the text, even on the line. Once embedded in this way, the equation will then flow with the text as part of the text.





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PipeLine

Gerald Fitton

First of all we have a few bits and pieces from various readers and then a tutorial on databases.

'Incorrect number of output bits'

George Thompson says that he got this printer error message after changing the background anti-aliasing pixel colour on any text. Is the module causing the problem the Colours, FontManager, !Printer, FPEmulator even the CLib module? Does anybody know what's going on?

Key strips

Professor John Greening has sent me examples of two kinds of key strip. These two files together with a ReadMe file are on the Archive monthly disc and will be included on the April 1991 PipeLine disc.

String handling functions

Steve Steadman's suggestion for an improvement to PipeDream is that it should include string handling functions such as the MID$(...) function in BASIC. He also suggests a new date type which shows just the month and the year as in February 1991 or 2.91 instead of the full date.

Unwanted line feeds

Steve Harratt and I corresponded over this problem which he had with an HP Deskjet 500. Steve finally decided to look inside and found that the dip switch settings were for American sized paper! This is longer than our A4. There are two banks of 8 switches called A and B. Steve recommends that all switches are OFF except A3, A4, A6, A7, A8, B1 and B2. He can then print to within 2mm of the top margin and has no problem with unwanted form feeds. He has written to his UK supplier!

He finishes this topic saying "However, for some reason I can get more on a page when using the PipeDream Printer Driver instead of RISC-OS . . . ". Can anyone shed any light on this?

Sideways scrolling

A letter to me from Anne Davies provides a solution to the question of Joe Buhagiar (from Australia). Joe wanted to know how to move sideways by more than one column per key press. Anne suggests defining a function key combination such as <ctrl-shift-f11> with a string which moves the cursor three (or more if you want) columns to the right. The function key definition is `\CNC|M\CNC|M\CNC|M`. If you include more `\CNC|M` then you will jump more columns. Similarly, you can define a movement to the left using `\CNC|M` in the key definition.

PipeDream on the Z88

I now have a Z88. Aren't they wonderful little machines? Now on Saturday mornings (when I don't have to get up early) I can tap away writing the PipeLine column in bed and transfer it to the Archimedes later with the !Z88 application. I'm thrilled to bits!

A Simple Database

Last month, I described what is perhaps the simplest of databases. Each record uses one row in a PipeDream document and has values for every one of five 'Fields'. This month I shall describe what I think is an instructive (but not the best) way of adding a new record and how to use the database to generate 'form letters'. I shall also show one way of producing labels using dependent documents leaving a second method (using a parameter file) for next month.

If you already have last month's file ([Girls]) then you can modify it by inserting a few rows in the places shown in the figure. All the formulae will change appropriately.

Look at figure 1. The five fields are: 'Name', 'Hair Colour', 'Eye Colour', 'Character' and 'Favourite Present' for each of the eight (fictitious) young ladies. I have reduced the width of column A to 8 characters and increased the width of the last column to 16 characters.

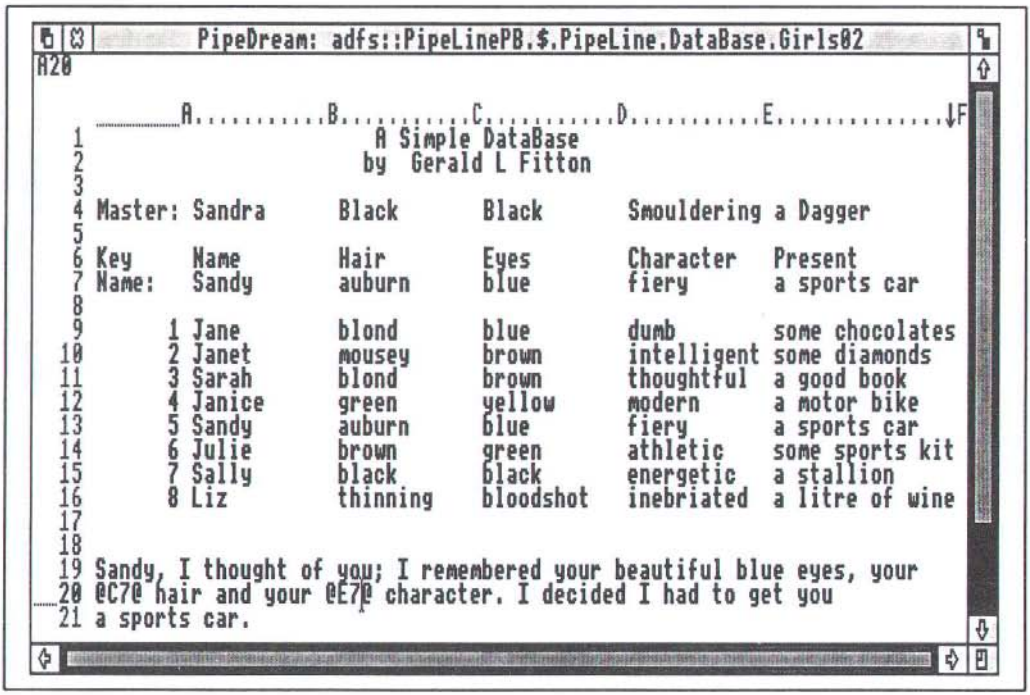

Figure 1

The records

The rectangular block of data, B9F16, is the database. It is all text and can be typed in exactly as shown. The rows 9 to 16 are the database records, one record per row and one field per column. To move right from column to column (field to field) you press <tab> and to move left you press <shift-tab>. To move from row to row you can use the return key to move down and the up arrow key to move up. You can use the mouse pointer to move around more quickly; click <select> with the pointer in the cell where you want the cursor or click the mouse on the scroll bars.

The lookup formulae

Type Sandy (in text) into cell B7. The only formulae on the sheet are in the cells C7, D7, E7 & F7. Place the cursor in C7, press <f2>. (Edit Expression) to enter a formula into C7. Type in the lookup formula:

```
lookup($B7,$B8$B17,C8C17)
```

as shown on the screen dump below and then press <return>. When you press <return>, the word 'Auburn' will appear in the cell C7. Last month I explained why I included the two blank rows 8 and 17 in the formula. Having entered the formula into C7 replicate it across the row to F7.

Adding rows

Perhaps the simplest way of adding a row is to place the cursor somewhere in the middle of the data and press <f7> to insert a row. All the formulae in row 7 will change to match the enlarged database. Type in the data and, if you want to, you can sort the database again on any column or columns. You can also delete a record using F8 to delete a whole row. What you must not do is delete either of the two blank rows which bracket the data (i.e. the ones referenced in the formulae). In figure 1 these are rows 8 and 17.

An alternative way of entering data is by copying a master row. The master row is shown in figure 1 as row 4. Type in data such as that shown. Now, using the mouse, place the cursor on the 4 of row 4 (i.e. in the margin or 'border') and double click. Row 4 will become highlighted ('marked' as in 'marked block'). Now use the mouse to position the cursor anywhere in column A within the data base (A9 to A16), click once and then copy the marked block using <ctrl-BC>. Finally, delete the word "Master:" (using F4) and you can go back to the master row (row 4) and modify the data for the next record.

Generally, this is a reasonably good method if you have a lot of fields, many of which don't alter from record to record. It is possible to write a macro (driven from a single function key such as <ctrl-shift-f1> or from say <ctrl-M>) which will mark the master row, copy the record to the database and bring the cursor back to the master row ready for the next data entry.

A form letter

Rows 19 to 21 contain a "Form Letter". A form letter is usually a letter sent to some or all of the people whose names are in the database. Often, the fields are names and addresses, money owed, prizes you might have won, etc, but we have other more attractive characteristics of our eligible young ladies. The letter is typed in with lots of @ characters bracketing cell references from row 7 as:

@C7@, I thought of you; I remembered your beautiful @E7@ eyes, your @D7@ hair and your @F7@ character. I decided I had to get you @G7@.

Note that the cell references do not have to appear in the form letter in column (or any other) order; any reference can appear anywhere in the form letter. If you want extra space for a long field then add extra @ signs behind the cell reference such as

```
@C7@@@@@@@@@@@@@.
```

In the screen dump shown in figure 1 I have placed the cursor in row 20 so that you will see the @ cell references. When the cursor is in any other row, the cell references in this form letter change into the values contained in the cells of row 7. So, if Sandy is typed into B7 then all values in row 7 will change to pick up the values from the database (the block B9 to F16), this is followed by the form letter picking up the cell references so that lines 19 to 21 will read:

Sandy, I thought of you; I remembered your beautiful blue eyes, your auburn hair and your fiery character. I decided I had to get you a sports car.

Mark rows 19 to 21 and (from the Print menu) Print marked block. The references will be evaluated before printing. You have printed a "Form Letter"! By changing the value in cell B7 to say, Liz, you can send a similar customised letter to Liz! Try it now.

Labels

The most usual use of linking a database to a label generating application is to produce address labels. My example isn't for address labels. It uses the database of E-Y-Ls; perhaps you want to label boxes of mementoes of the times you have spent together – photos, CDs, restaurant bills, etc. Although there are many ways of producing labels from a database, essentially these fall into two classes: (a) using dependent documents or (b) using parameter files. I shall deal with (a) this month and (b) next month.

Labels using dependent documents

Before you produce a set of labels, you may want to sort the file so that you can print a selection of the labels rather than all of them. I prefer to have the labels I want to print at the bottom of the database but you might prefer them at the top. You can complicate the formulae in the label generating document and not sort the database but I don't want to explain how to do that at the moment.

If you have it on disc, load the file [Label01]. If not then have a look at figure 2 which is a screendump of [Label01] (slightly modified as

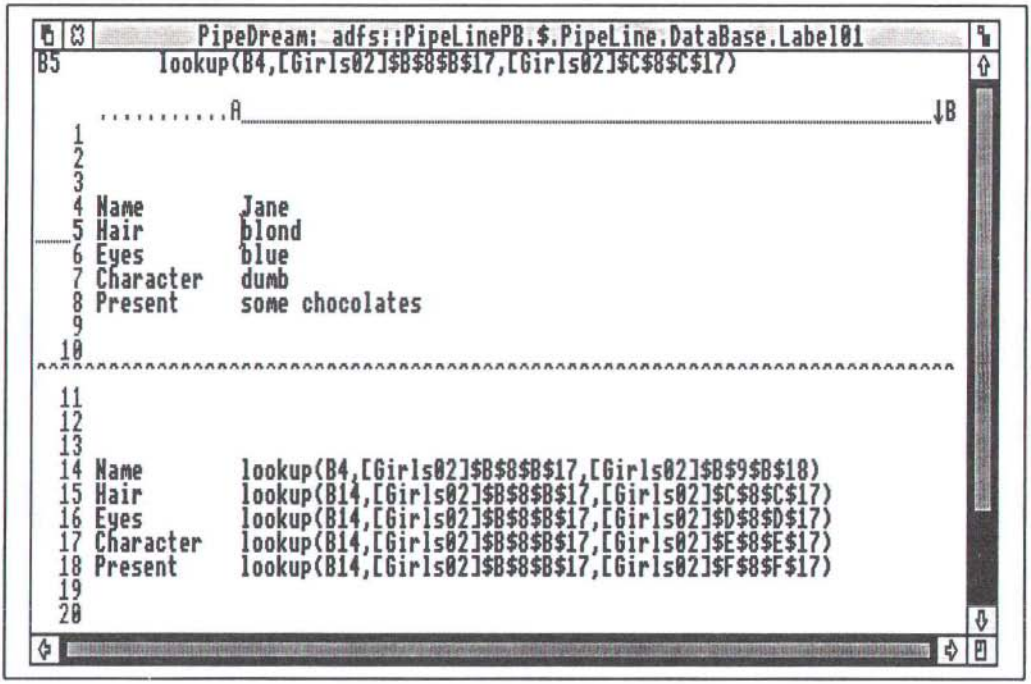

Figure 2

we'll see later). For the purpose of this tutorial, I have assumed that you have a single column of labels with each label having two columns. I have also assumed that the vertical distance from the top of one label to the next is ten PipeDream lines. If these values are unsuitable for your labels, you can modify the file accordingly.

The advantage of using 10 rows per label for this tutorial is that each label starts on a row such as 1, 11, 21, 31, etc and the printing occupies lines 4 to 8, 14 to 18, etc. This makes it a little easier for us 'denary' thinkers to see what is going on (eg the first 10 labels use lines 1 to 99 inclusive).

The cell [Label01]B4 contains the value of the key field for the first label. You can type in 'Jane' (the value) or the cell reference [Girls02]B9. The [Girls02] part of this cell reference indicates that the value you want is in the dependent document called [Girls02]. Make sure that [Girls02] is loaded or Pipedream might not find the file.

The screendump shows the formula for cell [Label01]B5. Press <f2> (Edit Expression) and type the formula in carefully remembering to enter the $ signs where they are shown. When you press <return> the word 'blond' will appear in cell B5.

Mark cells B5 to B8 and replicate with <ctrl-BRD> (Block Replicate Down). The result will be 'blond' in all four cells. There are many good ways of modifying the 'faulty' formulae but here's an instructive one. Mark the block B6 to B8 and use <ctrl-ENT> (Edit Number to Text) to convert the formula to (editable) text. Clear the markers with <shift-f3>. Place the cursor in cell [Label01]B6 and use <ctrl-BSE> (Block SEarch) to replace C with D. Repeat this for cells B7 and B8 changing the Cs to Es and

Fs respectively. Look a little further down figure 2 and you will see that cells B15 to B18 are in this form. Note that B14 appears in the formulae for the second label where B4 appears in the first – otherwise the formulae are identical. Finally mark the block B5 to B8 and <ctrl-ENT> again to convert the text back to formulae. Leave this block marked.

Move the cursor to cell [Label01]B14 and type in the formula shown in figure 2. If you have not done so already press F2 to convert the text to a formula. This lookup formula finds Jane in the range B8B17 and then returns the value found in the corresponding place in the range B9B18 (i.e. one record down the database); the value returned is Janet.

Place the cursor in [Label01]B15 and then <ctrl-BRE> to replicate the block B5B8 to B15B18. During this replication, the B4s will change to B14s but (because of the $s) all the rest of the lookup formulae will be fixed. If you have done all this correctly then you will get, not the formulae shown on the screendump (figure 2), but the second label.

You can replicate the block A11B20 down the column of labels as far as you wish. Generally the quickest way of doing this is by doubling the block size at every replication – this way it takes 10 replications to produce 1024 labels. Generally it doesn't matter if the label generator is too long – you can always delete some of it. Save this master label generator.

Before printing your labels, you can mark the whole [Label01] document and use <ctrl-BSS> (Block SnapShot) to convert all the formulae to values. This snapshotted file is editable as a plain text file so you can delete individual labels, add columns, move blocks around, etc, and see exactly what you have got before finally printing. Particularly with RISC-OS drivers, you can do useful things such as change the font, change the line spacing or change the print scale factor.

Once you have the [Label01] file, you can use it with databases other than [Girls02]. For example, suppose you want to use it with [Girls03] then you could rename [Girls02] to something else and then rename [Girls03] as [Girls02]. I use a variant of this method. My label file is used with files called [Addresses1], [Addresses2], [Addresses3], etc; I make a copy (using Copy) of the wanted file calling the copy [Addresses]. [Addresses] is the name of my dependent document in my [Label] generator.

You can use <ctrl-ENT> (Edit Number to Text) on the whole [Label01] file to convert the formulae to text, follow this by <ctrl-BSE> (Block SEarch) to replace [Girls02] with, say, [Girls], finally convert the text back to formulae with <ctrl-ENT>.

PipeDream User Group

Quite a few of you have asked me if there is a Pipedream User Group. The answer is "Not at the moment but... ". Well, do you want one? We'll see! PipeDream is available for MS-DOS machines, the Z88 (Yippee!) as well as the Archimedes. I do get a little correspondence from MS-DOS and Z88 PipeDream users but most is from Archive readers who (I assume) are primarily Archimedes users. The Pipedream User Group will have a Newsletter and provide some technical support. Write to me (at Abacus Training – address on the back inside cover) if you're interested in joining.

In conclusion

My usual plea. If you write to me with a problem or a hint or something even more substantial then please send an example on disc. That way it is easier for me to understand exactly what it is that's going wrong (or right) and it makes it easier for me to make the solution available to others. Also a stamp and a label will be appreciated greatly.

PipeLine discs

Thanks once again to all who have written to me. The January 1991 PipeLine disc came out on time (posted on 31st January!) but I have had to leave out some sprites and reduce a couple of the large databases to examples in order to fit it all in. I do thank all those who have contributed to that disc as well as all of you who write to me for publication in Archive.

I already have some material for the April 1991 PipeLine disc but please do keep it coming in. Even the simplest hints and tips are useful. After all, what seems too simple to be worth a mention to one person may seem an insuperable problem to another.

I think that, by now, most PipeDream users who are readers of Archive must be subscribers to the quarterly PipeLine discs. Nearly everyone who bought one disc has 'upgraded' to an annual subscription. I find this (and the praise) most flattering. If you aren't a subscriber, why not have a look at the January 1991 PipeLine disc? You too might get 'hooked' and take out an annual subscription. Individual discs are £5.00 and an annual subscription is £18.00 from Abacus Training.

I am particularly pleased when I get letters from correspondents overseas. I've received an interesting disc from Ron Pearcy in New Zealand containing eleven applications of PipeDream. It will take me a little while to work through them and decide what can be published in Archive and what on the quarterly PipeLine discs. I wish there were room to mention all of your names but space is limited! A

6502BBC Emulations

Brian Cowan

Before I start, I just want to get clear on some of the terminology. If you talk about the BBC micro, you could be referring to the old BBC computers: the model A, the model B, the Master and the Master Compact – all those which used variants of the 6502 microprocessor. The new BBC Microcomputer, the A3000, is an ARM based machine and in this article I want to talk about ARM emulations of the old 6502 based BBC micros. I will refer to those machines as the "old" BBC microcomputers, but through the odd slip of the tongue (or typing finger) I might call them simply BBC micros.

Emulation problems

In general, when one microcomputer imitates the behaviour of another, this emulation must operate at two different levels. Firstly, the CPU of the emulated computer must be simulated. In this case, that means implementing the 6502 instruction set in terms of ARM operations. Secondly there must be a simulation of the hardware and operating system of the emulated computer.

The first level problem is relatively simple for the present case of 6502 emulation; after all, the ARM instruction set was influenced considerably by that of the 6502. With good CPU implementation, the second level problem should not be too difficult. CPU oriented aspects of the operating system will be relatively unchanged, since the same instructions are simply passed to the CPU emulator. Hooks to hardware are more difficult. Keyboard and screen support are pretty well standard. Additionally, the emulation must connect with such things as the printer port and filing systems. Finally, for BBC emulation, there is the question of the Analogue port, User port and the 1MHz bus. Hardware for this, similar to that on the old BBC computers, is provided on the Acorn I/O podule. Since the hardware is similar, the emulation software support for this will not be too complex.

Why emulate?

At present there are Archimedes emulations available for a range of computers including the old BBCs, IBM PC/clones and Apple II. I believe there is an emulator for the Sinclair Spectrum, *(I have heard rumours but no concrete facts. Ed.)* and I think there is some sort of implementation of CP/M. Of course, we are eagerly awaiting a Mac emulator. The Archimedes, with its reduced instruction set CPU is ideally suited for the emulation of other CISC based computers since the complex instructions are easily implemented as sequences of simple instructions. To my mind, writing an

emulator of another computer is essentially a fun project (although not the sort of thing I would like to do). In other words I would not be inclined to regard it as a terribly serious pastime.

Software base

Clearly, when a new computer comes onto the market, there will not be a large range of software products available for it and software availability has a large influence on the sales and the popularity of a machine so emulation is an important feature at the launch of a new computer. Acorn regarded the initial consumer base for the Archimedes to be the old BBC fraternity – hence the BBC-like operating system of the Archimedes. Education and hobbyists were the target and many of these would already have made considerable investment in BBC software. It was therefore vital to provide BBC emulation as a means of transferring operation to the new machines.

Tube emulation

The old BBC could operate in two different ways. It could perform simply as a microcomputer, using its CPU as any other computer does. However, from the start, the BBC designers were thinking to the future. Using Acorn's "Tube", the BBC could be used as a terminal, providing all I/O facilities for another, possibly different, CPU. Second Processor CPUs included the Z80, 80186, 32016 from Acorn and various other models from other suppliers. Acorn also provided 6502-based second processors. Their advantage was to provide more RAM (since now almost the entire 64K address space could drive RAM) and they also ran at a faster clock rate. Much "legally" written software for the BBC could run in the 6502-type second processor including "languages" and other code sitting in the 16K chunk from &8000 upwards. Also, there were special versions of some software written to maximise the available memory space in the second processor.

The original BBC emulator provided when the Archimedes was released was called 65Arthur. This was an emulation of a BBC running a 65C102 second processor and BBC BASIC IV could be run under this emulation, including programs incorporating 6502 assembler. This means that many BBC programs could run directly and word processors such as View could be used. So, from the start, there was a considerable software base available to Archimedes users and schools could use much of their old BBC software. Later versions of this tube emulation were released under the name 65Tube.

Host emulation

Emulation of the BBC microcomputer operating in native mode was provided with the program 65Host. Later versions provided higher degrees of compatibility in such areas as sound production, sideways RAM/ROM implementation etc, etc. However, surprisingly, the one thing which was not provided was an implementation of the old disc filing system, DFS, though now there is a new version of 65Host with even greater compatibility. This version even comes with extensive documentation and utilities for conversion of old BBC software. *(Available until March 31st for the "special price" of £19.95 from Acorn Direct in Wellingborough.)*

Other ideas

These improvements are all most welcome, although the actual need for 6502BBC emulations is probably decreasing. There are, however, other developments for the BBC emulations which I would like to see. It would be wonderful to have BBC emulations operating as multitasking RISC-OS applications. In other words, one would have one or more windows open, each one emulating a BBC computer. This is probably a long way off.

More information

The lack of adequate documentation on the various BBC emulations has always been a problem. David Bower has been investigating the inner workings of these emulations and he has provided us with the following, rather useful information...

Notes on BBC Emulators

David Bower

The first note is valid for all versions of the !65Host emulator but the remaining sections only apply to the upgraded versions (1.40 and above) which can be found on the RISC-OS Extras Disc or Archive Shareware 17.

Reclaiming unused memory from ADFS

The default value of PAGE on !65Host running ADFS is set at &1B00, while a standard BBC Model B running DFS normally puts it at &1900. As the emulator does not simulate shadow RAM, all screen memory is taken out of the 32K available. If you have an application using 'high-resolution' graphics modes 0, 1 or 2 which occupy 20K, then memory-space for your program and variables can become very tight. The memory area between &1100 and PAGE is used by the filing system to provide a read/write buffer for each open disc file. If your application doesn't require disc access, then PAGE can usually be lowered to &1100 without any ill effects. (Simply type PAGE=&1100 at the > prompt after entering the emulator.) Other programs may need a higher value to function correctly. Some experimentation is called for here but you can try &1300 as a starting point. Gaining up to 2.5K of memory from one statement must be a good trade-off!

Some older DFS software breaches Acorn's guidelines and assumes that PAGE resides at &1900. In this case simply reset PAGE to this value.

Loading and activating ROM images

The User Guide instructions for 'caching' BBC ROM images are rather unclear. A simpler way to use these images is to load them into (emulated) sideways RAM after the emulator has initialised. There is a documented option in the !Run file for setting up the emulator with four banks of sideways RAM (as in the Master 128) and you can then *SRLOAD the desired images from disc. There is no "I" option for activating the ROM image automatically, but simply hitting the break key to re-initialise the emulator does the job.

Emulator Compatible BBC ROMs

The following language ROM images all appear to function correctly, though I must emphasize that I have only made cursory checks rather than performing exhaustive tests on all features.

Language	Vers'n	Source	Tube compatible
BCPL	7.00	Acorn	Y
C	1.50	Beebug	N (2 ROMS)
COMAL	1.00	Acorn	Y
FORTH-83	1.00	Skywave	Y
LISP	1.00	Acorn	Y
Logo	1.00	Logotron	Y
Prolog	3.10	Acorn	Y
ISO-Pascal	1.00	Acorn	Y (Hi version)
Pascal	2.10	Oxford	N
XBASIC	B.9	D. Bower	N
BASIC	40	Acorn	Y

(I used 65Tube version 0.64 for compatibility tests.)

65C12 Instruction Set Compatibility

The compatibility of BASIC40 – the Master Compact version which is the fastest 8-bit BBC BASIC and the most accurate for floating-point and transcendental computations – came as a complete surprise.

It demonstrates that the newer versions of the !65Host emulator support not only the 6502 instruction set but also the extra instructions and addressing modes found on the 65C12 CPU which is used on Master series machines. If you run BASIC40 – selected by *FX142,x where x is the image ROM slot as *BASIC simply reselects the cached BASIC2 – then the additional instructions will be assembled correctly. I have not seen this feature documented previously. A

HU-Prolog

Chris Williamson

In July 1989, I wrote a review of Acorn's Prolog System X. I concluded that article by saying that the Acorn product was very expensive for what it provided. In particular, System X did not provide the debugging facilities documented in the standard text on Prolog by Clocksin and Mellish. My other comment related to the inability of the system to produce stand-alone code.

Given the price of the Acorn system, *(and the fact that it has been discontinued – see below Ed.)* it is very pleasing to be able to report on an addition to the NCS Careware compilation, Careware Nº12. Andrew Stevens, a professional AI/computer science worker, has ported HU-Prolog for RISC-OS. HU-Prolog, or Humboldt University Prolog, was written by C.Horn, M. Dziadzka and M.Horn at the Department of Mathematics, Humboldt University in East Berlin. HU-Prolog is an interpreted Prolog and does not provide any compiling facilities. Historically, Prolog systems have tended to be interpreted rather than compiled. This is in keeping with their interactive nature.

I have not had a great deal of time in which to investigate the RISC-OS version of HU-Prolog. However, what work I have done with it does confirm the claim that it is an almost 100% implementation of the Edinburgh syntax as documented by Clocksin and Mellish. As yet I have not had any major problems, though there is one area of the syntax not covered. HU-Prolog does not implement the Prolog grammar rules (definite clause grammars). These are of most interest to people involved in natural language processing. The omission of this facility is not a great loss, as the grammar rules just provide a shorthand notation for something that can still be coded using the normal Prolog rules.

My review of the Acorn system included the results of a performance comparison between System X and DECsystem-10 Prolog. The DEC-10 is a medium size mainframe dating from the 1970's. The performance test was based on a plan generating program. The program could operate a depth or breadth first search to produce the plan. In the case of this example, the program was asked to produce a plan to solve the Towers of Hanoi problem. The results obtained are shown below, and are now extended to include HU-Prolog.

	HU-Prolog	Acorn Sys-X	DECsys-10
Breadth first	101.95	53.81	13.32
Depth first	61.83	27.78	6.73

All the results are shown in seconds.

After the comments I made regarding the lack of debugging facilities on the Acorn system, I am happy to say that these facilities are present on the HU-Prolog system. This does have to be qualified though. The bugs section of the few pages of machine readable documentation refers to the debuggers handling of backtracking. A simple test, on the lines of the example in the debugging chapter of C & M, showed that the debugger did not perform exactly as would be expected. The output during the test did not conform to the tracing model, but did appear to represent an understandable sequence of events with respect to the control flow. I have not had time to pursue this area of investigation any further.

A few other comments may be in order prior to concluding. The documentation provided is a little scanty, though Andrew states that he is happy to answer queries by paper or electronic mail. The system will run on a 1 Mbyte machine. I ran it on an A310 from the command line prompt. The documentation does suggest that HU-Prolog could be run from an !Edit task window. After attempting to do this with various configurations, I can only conclude that more than 1 Mbyte is required if the task window is to be used on the DeskTop. Like the Acorn System X, a number of extensions have been provided to the language. The documentation for these is in some cases a

little terse. The timer function used in the example program provided with the system is not documented at all.

To sum up then, the main points appear to be positive. First, compare the price of a Careware disc against the price Acorn are asking for its system. I shall leave you to draw your own conclusions on that one. Price of course is not everything. While HU-Prolog does not appear to match the speed of the Acorn system, it is still more than adequate for most tasks. It does implement a usable set of debugging functions; something that Acorn could not provide. In common with System X, HU-Prolog does not implement a stand alone program facility. Unlike the Acorn system, which has both a compiler and an interpreter, HU-Prolog only has an interpreter and so could not readily provide this feature. Finally, while the system is not in any way guaranteed, it is being used by Andrew and his colleagues in a professional environment and, as such, must meet a certain level of serviceability. A

(The validity of this review has been confused a little by the fact that Acorn have decided that their Prolog System-X is no longer available. (Neither are Lisp, Logistix or Zarch.) If anyone has a copy of any of these pieces of software and would be willing to give it to our charity sale, do send it in to the Archive office so that others who want it can get hold of it. If you would prefer to sell this or any software, feel free to use our Small Ads section – there's no charge. Just send in the text on paper or on disc but please note the use of the word "small"! Ed.) A

Language Column

David Wild

I have recently received a letter from a reader asking me to tell him whether he should buy Release 3 of Acorn's 'C' or the Beebug version. As I am not a 'C' programmer, I am not competent to make any recommendation but I think that it would be dangerous for me to do so in any case. *(Does anyone have experience of both that they could share with us? Ed.)*

I can, for instance, tell you why I think that Acorn's version of Pascal is still worth buying, even though it is dearer than Cambridge Pascal – but it would still be up to you to make the final decision. All such decisions are to do with the balance of advantage, with all programs having strong and weak points. Only you can decide which of the various points are relevant to your way of working.

Just occasionally during my micro-computing career I have come across a program which would be too expensive even if they gave it to you but so far, fortunately, none of these have been for the Archimedes. (Some of the games which re-configure your machine and then don't allow you to quit come fairly close!)

What you must do is to determine exactly what you need from a compiler and then create a check list for the available compilers. You can then tick off against your various points and see how they measure up. I would suggest that price should be relatively unimportant in this checking. If you are going to do a lot of serious programming you need to get the right compiler for your needs and if it means paying a little bit extra then you will have to do it. This applies even in the PC world where prices range from about £50 to more than £500. If the £500 compiler actually lets you write more programs in the next two years the extra money may be very well spent, whereas it would be gross extravagance if you only wanted to write one program anyway.

Pascal compilation

Since my previous article, I have received a new version of the Pascal compiler module from David Pilling. This allows for the use of "via" files, rather than libraries, to specify the

files containing modules to be linked. This means that you don't need any software to turn your "aof" files into libraries, although libraries can still be used if you wish.

Using this compiler module means that compilation with the Acorn compiler and linker is just as easy as using the Cambridge Pascal method while still retaining the advantages of separate compilation. It does also multi-task, although other processes slow down while the compiler is active.

David Pilling's programs are extremely good value, and I don't really understand how he manages to produce them at the price. If you are a serious Pascal programmer the spending of £5.99 on this program will repay itself many times over.

Scheme

In my review of Scheme, I mentioned it as an alternative to Acorn's Lisp – although, once again, that program does still have some advantages. When I was talking to a reader recently I mentioned Scheme and he said "Oh! but I'm not into artificial intelligence". Because Lisp has strong associations with AI, people are tempted to forget that it does have other uses. *(Sadly, Acorn have removed Lisp (and Prolog X, Logistix & Zarch) from their price list. If you have superfluous copies, why not send them in to our charity sale? Thanks, Ed.)*

One which could well be of value in education, especially at the price of £37.50, is the ability to write programs to do algebraic manipulation. Many "maths" programs actually deal with the evaluation of formulae and produce numeric answers, but in Lisp you can actually write functions to add $3x^2 + 5x + 4$ to $9x^2 - 6x - 3$ and get another quadratic equation as a result. This sort of thing goes a long way in reinforcing students' understanding of the underlying processes. A

Low Cost Multi-Media

Ian Lynch

In last month's column, I gave an outline of some of the possibilities in the developing field of multimedia. I now have a copy of Genesis 2, but rather than a straight review, I will be discussing several aspects of the software over a period of time. Hopefully, several of you will produce Genesis 2 applications and if there is enough interest, I will establish a Genesis 2 applications library, but more of this later. Genesis 2 is one of the most versatile pieces of software to emerge on the Archimedes and is a product of Software Solutions (now Oak Solutions after their merger with Oak Computers). This merger seems to me significant in that Oak are experts in storage technology and Software Solutions in the software technology which will enable multimedia to develop on the Archimedes perhaps in a more innovative way than it is on other platforms and almost certainly at lower cost. Time will no doubt tell.

Genesis 1

Genesis 1 has been available for a year now and is a part of the A3000 and A420 Learning Curves. It enables arbitrary links to be made between pages which can have frames containing !Maestro files, text, graphics or !Euclid animations. The beauty of Genesis 1 is that it also allows any application to be dropped into a frame and forms an effective extension to the RISC-OS desktop for presenting information in a variety of ways. I used it for my presentation of PC-Emulation and other operating systems during the New Horizons seminars at the Computer Shopper Show. Other examples, are the construction of a musical data base with examples of the composer's work or a simple card index. Since pages can be printed, Genesis 1 also provides the facilities for simple DTP and its frame nature is very similar to that used by Ovation and Impression.

Genesis 1 allows the user to create applications which run from the RISC-OS desktop, but there

are some restrictions which limit the scope of the applications. One major problem is that Genesis 1 applications take up a lot of disc space and consist of hundreds of files each containing information about the content of the frames on each page. This makes copying and distributing large applications very tedious. Using !Spark and !Sparkplug can help, but compression and decompression of the files is also relatively slow. Another restriction is that it is not easily possible to make conditional events in Genesis 1. This means, for example, that the user has to double click on a music file in order to play it rather than the application playing the music automatically if, say, a page is opened.

Genesis 2

Many of these restrictions are overcome or reduced in Genesis 2 and the software also allows some additional data types, most notably sound samples from !Armadeus. These samples are buffered from disc so that they do not take up more than 16K of memory. File compression has also been used to help save disc space and Genesis 2 applications can take up a lot less than half the space of Genesis 1 applications depending on the data types involved.

Perhaps the most exciting addition to Genesis 2 is its ability to create the dialogue boxes and conditional events which characterise RISC-OS desktop applications. What this means is that Genesis 2 can be used to generate complete desktop applications without the need to know C, BASIC or any other programming languages. However, some knowledge of programming is an obvious advantage.

Genesis generates its own script language which can be edited to provide further flexibility. It should be possible to write and debug an application in perhaps a tenth of the time that it would take to program it in BASIC and probably a lot less than this in many cases. The only catch is that applications will tend to be longer than those written (efficiently) in BASIC and will execute relatively slowly in some parts. Obviously, Computer Concepts would not write a DTP application using Genesis 2, (they still use assembler for speed and compactness – what patience!) but there is a very acceptable calculator and a simple spreadsheet with graph drawing application on the examples disc which comes with the package to demonstrate the application generation potential of Genesis 2.

I can see enormous potential for those who would like to write applications for computer aided learning which require audio and good quality graphics, but where speed is not a critical factor. In fact, graphics animations through !Euclid will be possible so the speed restrictions are not necessarily associated with this aspect of an application, though space invader type games would be a problem.

Genesis 2 also provides an ideal tool for a team approach since the !Euclid expert can produce the film animation, the music expert the Maestro file, the graphics expert the pictures and the literary genius the text. The machine code programmer can do that tricky bit that needed more speed and the software product manager can make sure the whole thing comes together properly. It does seem likely that home users and those in the education world will be able to write their own software vastly increasing the number of RISC-OS applications available. Perhaps we could have a joint Archive effort with several people with different interests contributing to a collective masterpiece which could be sold for charity! *(Anyone interested should write to Ian c/o the Archive office. Ed.)*

Other products

There are some other developments in multimedia on the Archimedes in addition to Genesis 2 and I will endeavour to keep a track of these. As a matter of interest, I have looked at Linkway on PCs and Genesis 2 has several major advantages, most notably ease of use. Children, in particular, seem to find it a lot easier to be creative using Genesis than they do using Linkway. Part of this is as much due to features of RISC-OS such as direct in-memory transfer as it is to do with Genesis but, as with most RISC-OS applications, it is the combination of

ARM speed and RISC-OS which enable the innovative programmer to produce applications which are both powerful and easy to use.

A more powerful tool than Linkway, called Authorware on the Macintosh is very impressive, being used to author computer based training applications in industry. This is being ported to PCs though it will perform very poorly on anything less than a 286. Another factor is a price tag of £5,000 – who said that Archimedes software is too expensive? – but the company using it reckoned that it saved them more than this much in the first application they produced because it was so much quicker than writing in Pascal. I recently had a 'phone call from Peter Deutekom in Holland where the government flying school are using Archimedes and their own software coupled with Wildvision equipment to make instructional videos. A logical progression could be into interactive learning systems. If you know of something interesting on any of the platforms, drop me a line.

It will take me some time to become familiar with all the subtleties of writing Genesis 2 applications, but over the next few months, I hope to generate some examples so we can all learn together. I will be concentrating on Genesis 2, but some things will be common to Genesis 1. If you can afford it and would like to get into writing your own applications, the upgrade is well worthwhile. In fact, if you can only afford one major software application, Genesis 2, like !Pipedream is worthy of consideration since it can provide DTP, database, spreadsheet and applications generation. Genesis 2 can also access CD-ROM and Laser Vision discs, so if you have the funds available for these rather expensive hardware devices, Genesis 2 is almost essential if you want to make best use of them. ARM3 also makes a significant difference to screen drawing particularly when using outline fonts so it is fair to say that Genesis 2 will make good use of any resources you have available at the same time as working on a single Mb ARM 2 without a hard disc.

Next month, I will go through the creation of a simple application. In the meantime, do write and let me know what you would like to see in later columns. A

Tracker

Mark Drayton

This is a review of the !Tracker application, programmed by F. Mercier for the Serial Port, which costs £49.95 (or £46 through Archive). For those of you who are not familiar with the Soundtracker idea, I refer you to Toby Simpson's excellent articles in Archive 3.8 and 3.11. They explain with clarity the basic mechanics behind a 'Soundtracker' tune.

The !Tracker application allows you to create the Soundtracker tunes for yourself, using samples from other tunes or by using samples from software packages such as Armadeus. The application installs itself on the icon bar, and is semi RISC-OS compatible, as it occupies the whole of the machine while running, but will return to the desktop with everything intact. !Tracker grabs a hefty 640K when installed in order to cope with a tune with many samples, but this may be a bit too cautious, and can be changed by altering the !Run file within the !Tracker directory.

The package comes with four discs, one containing the main programs (including !Jukebox, a program which will simply play the tunes using the existing public domain play module), another containing some demonstration tunes, and two others containing samples which can be used to create tunes for yourself. The manual I got was a rather hurried affair, due to their rush to get the program ready for release for the Acorn User Show. However, it was fairly clear and informative but I expect a newer version has now been written. An upgraded version of the original program is now available which

incorporates midi compatibility, but which offers only a slight improvement and still contains a few of the original bugs.

Within the program, the display shows the construction of each tune clearly, with all the information on each sample available. There are eight possible voices, each with a slider for controllable stereo positions, but there is rarely the need for more than four. A very impressive imitation spectrum analyser gives something for your eyes to feast on while your ears enjoy the music. There are also twelve panel type buttons, (selectable with the mouse), such as play, stop etc., and also a record facility which allows you to 'play' the music using the keyboard. The program records the values of the play rate in a pattern which you can then alter to perfection. An options button brings up a display which gives the following selections: internal speakers on/off; number of voices; sample format (for compatibility with samplers); pattern display (scrolling / half scroll / no scroll); and Midi status / channel.

The package is well presented, with attractive features such as a play clock and a scrolling message box. In my experience, The Serial Port are very courteous and helpful, and provide an excellent back up service. The library of Soundtrackers built up by some public domain libraries is huge, and I myself have eight discs full of tunes selected from a much larger number. They are all public domain, so if anyone is interested in finding out what the Archimedes sound system is capable of, or simply wants more tunes to play can write to me at 38 Baunton, Cirencester, Glos. Gl7 7BB. Please send me a disc to put them on, and I would appreciate a small fee of £1 per disc to ensure a snappy reply!!

It is my opinion that although this system originated on the Amiga, (shudder), this is by far the best music software available for the Archimedes/A3000, making Maestro look positively agricultural in comparison. The price is perhaps a little high, but for anyone who is at all interested in music on the Archimedes, this is a 'must'. A

Using the PC Emulator – Part 7

Richard Forster

If batch files were limited to just what we discussed last time, this would indeed be very limiting. Fortunately there are two other things they can do, which gives them a reasonable amount of power – you can pass parameters to them and they have a host of special commands.

Many commands have syntaxes which require extra data. For example, when using the COPY command, we have to add the name of the file being copied, and where it is being copied to. batch files can take these extra details by means of the % sign and a digit from 1 to 9. These represent the detail on the command line in the position referred to by the digit. So if our command line happened to be:

```
BFILE  ONE TWO FOUR
```

Then occurrences of %1, %2 and %3 in the batch file, would be taken as "ONE", "TWO" and "FOUR" respectively. If the program asks for a parameter which is not in the command line (for example asking for %4 in the above situation) then the batch file will presume this parameter to be a blank. This may or may not create an error and, because of this, you should be careful to watch what you type, or executing the file may have an unexpected result.

%0 is a special parameter. When it occurs in a program, it stands for the program's actual name. In the above example %0 would be BFILE. Another special parameter command allowed in batch files is SHIFT. Normally you can only have 9 parameters (%1-%9), and this is generally enough, but you may need more. Every time the command SHIFT is executed, the command after %9 on the command line

becomes %9, and %9 becomes %8 etc. You must remember if using this command that after the first SHIFT %0 will be lost.

A new command – MOVE

A useful command which is not included with MSDOS is the move command, and so with the use of batch files we shall make one. Basically, a move command will move the specified command from A to B, leaving no copy of it at A (unlike the copy command). Using edlin to create the file MOVE.BAT, put in the following data:

```
COPY %1 %2
DEL %1
```

So to use the command, you simply type in MOVE followed first by the original name of file, and then the new location of the file, just as if you were using the copy command. If you typed in:

```
MOVE C:\BITOF.TXT C:\STORE
```

The file BITOF.TXT would be moved into the directory STORE (presuming it existed first of course). The actual batch file would effectively be executing:

```
COPY C:\BITOF.TXT C:\STORE
DEL C:\BITOF.TXT
```

This command has some hidden power, and also some hidden danger. Both are connected to the same thing, namely what would happen if the second parameter was omitted. What the batch file would then do, would be to copy the file into the current directory, and then delete the old copy of it. This is fine unless the file being copied was already in the current directory, where it will be deleted. Forgetting both parameters will simply give a couple of "Invalid number of parameters" errors when the relative lines attempt to run.

To echo or not to echo

The simplest, and in many cases the most useful, of the batch commands is ECHO. In has two uses, both of them controlling output to the screen from a batch file. Normally when a batch file is run it displays each line as it executes it (as you may have noticed when using the move command). This is often required so that the user can see what is happening, but often it is unnecessary. By executing the command ECHO OFF at the start of a batch file these line are not printed to the screen.

A file with a first line of ECHO OFF will print that command to the screen but none of the subsequent lines. It can of course be turned off at any point in the batch files execution, with the command ECHO ON. Switching echo off only stops the command to be executed being displayed – messages from MS-DOS will still be printed. If we added ECHO OFF to the first line of our move file (something I do not suggest, because in its present state, the user can escape by pressing <ctrl-C> if he notices something is going wrong), although we would not have seen the COPY commands being executed, we would have seen the messages line "1 file(s) copied".

Command messages in batch files can still be redirected to other sources instead of the screen by using the > symbol. There is a special place we can direct these messages to if we do not want them at all, and this is nul:. If we had the line:

```
COPY %1 %2 >nul:
```

in our batch file, we would not get the message that the file had been copied. Whether or not we saw the command would depend on whether echo was on or off. MS-DOS being an intelligent beast at times, will still send us any important error messages.

Another use of ECHO is to send a message to the screen. When it is not followed by either ON of OFF, this is exactly what it does. It is of slightly more use when echo has previously been turned off, because otherwise the message is effectively repeated. For example, you would see:

```
Echo move program running . .
.
move program running . . .
```

Whereas with echo off you would simply see:

```
move program running . . .
```

If echo is on, it is far better to use the REM command rather than the ECHO command. As with BASIC, a REM command is simply ignored by the computer and so, with echo on, it is printed on the screen and, as it does nothing, the computer will move on to the next command.

The second really useful batch command is PAUSE. When the computer comes across this in a batch file it pauses, prints the message "Strike a key when ready . . ." and then waits for a key to be pressed before continuing. If you use this command, but do not want the prompting message to appear, use:

```
PAUSE >nul:
```

This is of use if you used echo to print a prompting message more suitable to the situation.

To show the use of ECHO and PAUSE we shall now update the move command so that it is more user-friendly and easier to stop if something is going wrong. You could use edlin to edit the old program, but because it was so small it is probably easier to delete the old move.bat file and start anew. When you are ready, enter the following program:

```
ECHO OFF
COPY %1 %2 >nul:
ECHO %1 has been copied as %2
ECHO About to delete old file
PAUSE
DEL %1
```

By adding the messages and the pause you can now see if the file has been copied successfully and, if so, just press a key to delete the old part. If you notice that something has gone wrong you can simply press <ctrl-C> to abort. The above example also demonstrates the fact that you can put %1-%9 in an echo message.

IF, GOTO and FOR

The final three commands for batch files are used less often and make it far more like a small programming language. The commands IF, GOTO and FOR allow conditional execution, skipping of steps and repetition. Most batch files simply run from start to finish, executing every line, and these commands are only really used in more complicated batch files.

IF checks for certain conditions, and if they exist will execute a certain command line. IF NOT can also be used, and this will execute the command line if the condition is not met. The actual conditions are of three types – strings being equal, errors having occurred, and the existence of files.

The string comparison compares two pieces of text between quotation marks, and checks whether they are equal. If a parameter occurs in one of the strings (e.g. "%1") then it is replaced with the string it actually represents. Between the two strings there must be two = signs. If, for some reason, we wanted to know when we were moving our move program, we could add the line:

```
if "%1"=="move.bat" echo Moving
                    the move program!
```

If we entered move.bat as our first parameter, the computer would print "Moving the move program!" to the screen. When a parameter occurs in a string but is not used, it is replaced by a blank (not a space, because spaces, equal signs, commas and semicolons are not allowed in these strings). So if we wanted to check that a second parameter had been entered we could use:

```
if "%2"=="" echo No second
                        parameter!
```

IF can also check whether an error has occurred. This is because many of the MS-DOS commands send numbers back to MS-DOS on their completion (this is how it knows when to print a special error message, and why these messages are printed even when the command's output is going to a file or nul:). This number is a 0 if no error occurred, and a positive integer if an error occurred.

IF can check this using the extra command ERRORLEVEL followed by a number. If the

number returned to MS-DOS was equal or higher than this number, the command line will be executed. So, if we wanted to print an error message when part of our program went wrong, we could use a line similar to:

```
if errorlevel 1 echo AN ERROR
                    HAS OCCURRED!
```

If for some reason we wanted to indicate everything was running fine, we could use a line like:

```
if not errorlevel 1 echo
            EVERYTHING IS A-OKAY.
```

Finally, we can use the word EXIST and a file name after IF, to see whether a certain file exists. More often than not, this command is used with IF NOT to see if a file does not exist. In our move program it could be useful to know if the file we were trying to copy did not exist, and so we could add a line:

```
if not exist %1 echo File %1
                    does not exist!
```

The problem with IF so far is that it will only execute one line. By using the GOTO statement we can skip to an area of the program, and execute as many as we want to. If you have used GOTO in BASIC you may be wondering how to use it as our batch files have no line numbers (the ones in edlin are for reference only.) The answer is by using labels.

Using labels

A label in a batch file is a semicolon followed by a name. If a batch file comes across a label when running, it ignores it. By specifying the label's name (ignoring the semicolon), after a goto statement you can jump through the program to that label and continue execution from there. We can thus modify our move program to jump to the end when we ask it to copy a non-existent file. Using edlin to edit the program, change it so that it looks like this:

```
ECHO OFF
if not exist %1 goto nf
COPY %1 %2 >nul:
ECHO %1 has been copied as %2
ECHO About to delete old file
PAUSE
DEL %1
goto end
:nf
ECHO The file you want to move
                    does not exist!
:end
```

As you can see, GOTO is not just limited to being used after an IF statement. As an exercise, try changing the program so that it tells the user if they have forgotten to enter any parameters what the syntax is.

Finally, for this month, we come to the FOR command. For allows you to repeat a command on various files. If you had five text files on a disc and wanted to view them all using the type command, this is the best way of doing it. The actual command you would use is:

```
for %%a in (*.TXT) do type %%a
```

The %%a is the variable name used by FOR, and can be any letter preceded by double percentages. The item in brackets is the set of files which the command will be executed on (in this case all files with the ending TXT. The final bit, type %%a, is simply the command. In turn, each file ending TXT will become %%a and so it will type all the files. The actual syntax of command is: for (variable) in (set of files) do (command) (variable).

The * used above is a wildcard, and they are worth a brief mention. Wildcards, as the name suggests, can stand for anything. There are two type in MS-DOS, the asterisk (*) which stands for any number of characters, and the question mark (?) which stands for a single character. So to delete all the files in a directory with the ending FUF you would type in:

```
DEL *.FUF
```

and to delete all files with an ending which starts and ends with F you would type in:

```
DEL *.F?F
```

That's about all for this month. As a final note, several programs are available for PC's, many public domain, which allow enhanced batch files – allowing user input while running etc. A

Impression II in Context

Stuart Bell

In Archive 1.1, October 1987(!), Paul reported, "Computer Concepts' DTP Package, as yet unnamed, sounds more impressive than the DTP system I'm using to prepare this magazine.... " The description that followed painted a remarkably accurate picture of what Impression would eventually look like and concluded, "I can't wait, but I'm going to have to as it is scheduled for "Early 1988". It was not until late '89 that Impression finally saw the light of day, preceded by Acorn DTP, and followed by Beebug's Ovation. Tempest is due out any time and the original Impression has been followed by a significantly more powerful Impression II and a more basic, yet still very useful, Impression Junior.

Whilst Impression II may be the all-singing all-dancing DTP package for the Archimedes and A3000 users, very few of us will have widespread experience of DTP on other machines. Paul started Archive on a Mac (I trust that he is Archimedes-based by now!), *(Sure am! Ed.)* and Ian Lynch, the original DTP column editor, admitted to experience of Pagemaker on 386-based PCs. Where then does Impression II fit into the wider world of Mac and PC-based DTP? That's the aim of this article – to put Impression II in context.

First, let me admit that my experience of other DTP is very limited. It's because I was so impressed by Impression that I wanted to find out if it's as amazing as I thought. The October 1990 edition of Byte provides the background – an in-depth review of seven high-end DTP packages for the Mac and PCs entitled. "Is the Typesetter Obsolete?" distinguishes five page-layout packages from two document publishing programs. The former group take prepared material produced on word-processing and graphics packages, and enable the user to produce well laid-out brochures, leaflets and books. If any complex editing is required, the WP must be loaded and the text changed before being reloaded back into the layout program. Thus, such well-known packages as Venturer Publisher and Aldus Pagemaker 3.01 on a PC lack simple editing functions like search-and-replace and a spelling checker. Similarly, Quark XPress 2.12 on a Mac lacks Index and Contents generation, whilst Letraset DesignStudio 1.01 (again on a Mac) won't handle sub- or super-scripts.

Producing lists of missing features is, in itself, a futile exercise – such a list could, and indeed will be, produced for Impression II. What they do illustrate, however, is that Impression II should be compared with the second group reviewed, the document publishing programs Frame Technology Framemaker 2.1 (tested on a Mac but available for use with Unix), and Interleaf Publisher 3.0 (on a PC). Pretty soon, however, it becomes clear that with the latter having so many deficiencies relative to Impression II (maximum point size 72, no configurable rulers, no master pages, no fractional point sizes and no scaled screen views, etc. etc.), the real "head-to-head" encounter that will set Impression II in a wider context is a comparison with Framemaker 2.1 on a Mac. So, here goes...

Hardware platforms

The minimum hardware requirement for Framemaker is a Mac SE with 2Mb RAM, although it was tested by Byte on a Mac IIfx with 4Mb, a 13 inch AppleColor display, and an 8 – 24 Display Card. Both configurations require an Apple Laserwriter IINT. My local Apple dealer tells me that the minimum set-up – the SE 30 is the only current SE model, but a 68030 is probably advisable for DTP in any case – comes in at about £6,000. The top end Mac system works out at a mighty £9,500 inc. VAT. The new range of lower-priced Macs will have changed things somewhat, but I wouldn't try serious DTP on the 68000-based Mac Classic.

Equivalent Archimedes packages might be first an A440 equivalent with mono screen, and CC's Laser Direct Printer. Archive VAT-inclusive prices total £3150 including Impression II. The top-end system (say a 540 and Taxan 795 multi-sync, even with the HiRes version of Laser Direct) only manages to reach £5600. PC-based systems are cheaper but, to match a 540, a fast 386 system with EDSI or SCSI discs, Super VGA display and a Postscript printer will be needed. Machines like that with recognisable names (Tandon, Epson, etc) come in at about £3.5K plus printer and software. As for '486s...

Whilst comparing the cost of hardware platforms, we should remember that Impression will work quite adequately on a 1Mb system and a single floppy, but runs very nicely on an A3000 with 2Mb, Oak's new low-cost 20MB SCSI disc and the Hewlett Packard DJ500 ink-jet printer. I make that £1840 with a medium resolution colour screen.

Apparently, that suggests 'Round 1' to Impression. The problem is, of course, that if people already have sufficiently powerful Macs or PC's, then the cost is much less. What we are trying to do is evaluate Impression in a wider context, not expecting that people will ditch their PC's just because of Impression.

Page layout

Even looking across all the seven packages which Byte tested, the page layout facilities of Impression compare well. It lacks a grid system but the page-ruler facility (new to Impression II) arguably provides a similar tool. The Master Page capabilities are notable, especially now that chapters with pairs of master pages can start (as they usually should) with the right-hand master. Some layout packages offer a Pasteboard (a Clipboard on which elements can be viewed and moved) to hold material which has yet to be added to the current page. Again, Impression's ability to have multiple files open (not found on most pure DTP programs), permitting the use of a temporary scratchpad file, provides a comparable facility.

Typography

Whilst older DTP packages limit the precision with which point-sizes can be defined, Impression at least matches newer systems. Its 'lock to linespace grid' is comparable to FrameMaker's vertical justification, and the 'Keep together' style attribute provides some of the functionality of proper control of 'widows and orphans' (single lines of text at the top and bottom of pages). It does, however, lack some of the sophistication of hyphenation and justification algorithms provided by DesignStudio or Quark Xpress to emulate traditional typesetting niceties.

It is in the provision of tracking that we encounter the first arguable weakness in Impression. This term describes the amount of horizontal space within text. Generally, the larger the text size, the less space (proportionally) is required to make it readable. Some packages, such as PageMaker, allow the use of different levels of tracking – from very loose (letters spaced) to very tight (letters very close together). If a line will not quite fit where it is required, tightening the tracking can be very useful, as it can be on a larger scale with slightly over-long material. Impression implements an approximation to this with the 'font aspect ratio' figure, the problem being that this also changes the sizes of the characters, as well as the space between them. So, variable tracking starts my wish-list for Impression III.

When the space between letters is reduced to the point at which they start to overlap (e.g. a capital V next to a capital A), this is termed kerning. On many specialist typesetting systems, and Letraset's DesignStudio and Quark's XPress, for each font there is a kerning table which lists the optimum spacing for every possible pair of letters, or at least those pairs, like A and V, which **must** be kerned if they are to look 'right'. Impression's ability manually to control kerning to one thousandth of an em is matched only by DesignStudio. Framemaker manages only 0.1 em. However, there are no kerning tables – every AV pair must be manually kerned

– which is a minor inconvenience, rather than a major shortcoming.

Text handling

As we noted in the introduction, Impression's ability to manipulate text sets it apart from page layout packages. Only Framemaker matches it.

Views and printing

Impression's capability of displaying pages at virtually any magnification, and with text always optimally free of jagged edges, is a tribute as much to Acorn's Font Manager as to Computer Concepts' programming. Nevertheless, it bears repeating that the quality of screen text that Archimedes users take for granted is unmatched by any PC and only now is about to be emulated by Apple's latest system software. If you don't believe me, get a PC DTP user to give you a 400% blow-up and see those 'jaggies'! (Only FrameMaker could manage 800%).

Most layout packages are pretty competent at printing out their results. With Apple having failed to update its dot-matrix ImageWriters for years, Postscript laser printers are the only (expensive) option. PC packages will drive HP LaserJets (and compatibles), but the high-end products favour Postscript. In any case, if a final document is to be properly type-set, then the ability to produce Postscript files is essential.

Impression itself provides all that might be expected. On cheap printers, like HP's DeskJet, it is slow but, in my personal experience people just don't believe what a £350 printer has produced, even if you can make a cup of coffee whilst it prints a page! Its draft printing facility attempts to overcome the speed problem, but is rather limited. The output of the text story for later printing can be a better solution.

The one aspect of Impression discussed in this article of which I do not have experience is its use with the Laser Direct and Arc Laser. Both printers, which have been described in Archive, provide fast output at relatively low cost by directly connecting the printing engine to a podule in the host computer. The Hi-Res version of the former works at up to 600 dpi – not up to the standard of commercial typesetting, but visibly better than run-of-the-mill 300 dpi printers (£1560 inc VAT from Archive). Even that beauty is cheaper than any Postscript laser printer. However, Postscript output is also provided, including output to file for typesetting. By using !PC-Dir, transfer to a PC-format disc should be easy, but can anyone tell me of a typsetting service **which exists now** for Impression users that will handle Archimedes discs directly?

Graphics

Impression makes no claim to be a graphics package. CC's attitude is, apparently, that it makes much more sense to multi-task it with other software than to make it larger – too large for 1Mb machines – by duplicating the kinds of thing that !Draw does. DTP packages that include a graphics capability usually offer little beyond tables, rectangles, circles and the like. A stand-alone package will, in general, be needed for anything more complex. (Incidentally, !Draw+, a.k.a. !Draw1½, on Shareware 34 is a vast improvement on !Draw but the FPE must be loaded first – see Archive 4.3 p23.)

Impression's scaling, cropping and rotating of imported graphics is beyond reproach. When combined with the software supplied with its scanners, the handling of graphics images is further extended. I do, however, have one 'wish'. At the Computer Shopper Show, I asked CC how to get text to flow round graphics images (as opposed to the frame holding the image) as, for example, around the keyboard in the original Impression advert in Archives 3.2 to 3.9. "It's a trick", they had to admit, achieved by the use of several small frames in a step formation down the edge of the keyboard. They promised it for a future release. It'll be nice when it arrives, as the majority (but not all) of Mac and PC packages provide such a facility.

Impression in context

Before I prepared this article, I was impressed with Impression (groan) but had no real idea

how it compared with PC- and Mac-based systems. I'm sorry if it's turned out to be a eulogy for CC's flagship package. From what I've seen of Ovation, it also provides a powerful DTP facility at a price which would amaze users of other machines even more than does the cost of Impression. Remember, the list prices for all the DTP packages which Byte tested are $795. The document publishing systems are $995 and we all know the kind of dollar conversion rates which apply to US-originated software!

I was amazed at what the famous packages of which I'd heard so much, but never used, do not have, making a good word processor – and a lot of 'to-ing and fro-ing' – essential.

My 'wish-list' for Impression really only runs to two entries – proper variable tracking and a more powerful kerning facility. The timed back-up which Ovation offers would also be useful, especially as, not surprisingly for such a powerful program, Impression is not yet totally crash-proof.

Were I a PC or Mac user, I'd be asking why Computer Concepts invested so much time on software for such a minority-interest machine. Assuming that a 80386 or 68030 is powerful enough, then Impression on one of them could have swept the market with the right price and advertising, and made much more money for Computer Concepts.

As I'm an Archimedes user, I'm glad to confirm that Impression more than holds its own in the wider context of DTP and document publishing programs on **any** personal computer. A

Preparing Material for Archive

Paul Beverley

In order to speed up the preparation of the magazine, I would ask that people sending in material on disc should try to follow a set of guidelines – what you might call the "house style" of Archive.

Disc format

The text you send in can be in any disc format you like: 3½" or 5¼", E, D or L format – even MSDOS if you really have to!

Wordprocessor / DTP format

We can cope with almost any WP / DTP format but, for preference, would like Impression since that is the application we actually use when producing the magazine. If you do have Impression or Impression Junior, let us know and we will send you a sample document with the styles on it. Come to think of it, we might as well send you this document as a sample!

House style

For those of you who produce a lot of printed material, I know it's difficult to change your style but, if at all possible, I would like people to prepare their articles for Archive with a particular "house style". I'm not talking about your style of writing – your turn of phrase etc – I mean the way you lay it out. A few examples will show you what I mean.

Headings

If you look at the title of this article, you will see it is in titles, i.e. initial capital letters for the main words, whereas the section headings only use an initial capital letter on the first word except where the word would have a capital anyway, like "Impression" or "Archive", or the name of a product like: "How to use Impression".

Indents

There is no need to create indents, either with spaces or tabs. This is dealt with automatically by the "styles" used in Impression. Thus, if you have a couple of lines of program to insert in the text, as for example:

```
 10 REM> WonderProg
100 PRINT "This is a load of
    rubbish"
110 GOTO 100
```

What you should send in as text is just:

```
10 REM> WonderProg
100 PRINT "This is a load of rubbish"
110 GOTO 100
```

I then give it styles which set the typeface and add the indent. If you had already given it indents by adding your own spaces, I would have to strip them out otherwise I would get a double indent.

Impression styles

The observant among you may have noticed that the "space after paragraph" for the first two lines of the program is smaller than that after the last line. This is done deliberately in order to separate out the program segment from the rest of the text and yet not have the program itself too widely spaced. To achieve this we have two different styles: programtext and programtextend. I am sure that you to work out which is which!

Tables

If you have tables within the text and you lay out the data in column by using spaces, remember that what looks OK in mono-spaced type looks funny when typeset in a proportionally spaced type.

Thus...

```
Brown    6.5    13.6    11.11
Alliss   2.3     9.6    88.88
Mummy    1.1    11.1    99.99
```

may look OK separated by spaces but if I put that into proportionally spaced text, you get:

Brown 6.5 13.6 11.11

Alliss 2.3 9.6 88.88

Mummy 1.1 11.1 99.99

If you want to uses spaces to print it out, that's fine – I then just use search & replace to change multiple spaces into tabs. However, if you can present it using tabs, it makes my life easier.

If you are using Impression and you set up a table using a new ruler, firstly remember that the text has to fit, if possible, into a normal column width and, secondly, don't leave the names of any new rulers as "Ruler1", "Ruler2" etc. Use your own name or some code word, like Lynch1, Lynch2 etc. The reason for this is that when you paste text from one document (your article) into another (the magazine) if a style of the same name exists, it maintains the definition specified in the destination document so you will lose your carefully set out tabulations.

Abbreviations

I try, as far as I can, to use standard abbreviations and I try to be consistent (but don't always succeed). Here is a list of some I use:

a.m. (with full stops)

BASIC (not Basic)

e.g. (with full stops)

i.e. (with full stops)

Kbytes or just K (not Kb and not k or kbytes. Yes, that's a change to make it consistent with Mbytes.)

Mbytes or just M (and not Mb)

p.m. (with full stops)

RISC-OS (not RISC OS, Risc OS, RISCOS etc as I have seen in other documents)

We refer to the computer we all know and love as an Archimedes, not an Arc or an Archie, please.

Archive references

When referring to articles etc in previous issues of Archive, the convention is to use,

```
"Archive 3.4 p45"
```

Spell-checking

If possible, please run a spell-checker over your text before sending it in.

Dashes and hyphens

A hyphen is the character on the keyboard between the zero and the equals sign and is the thing used in hyphenated words – e.g. RISC-OS – whereas dashes are produced as <alt-153> or from the !Chars application and are used for separating bits of text as earlier in this sentence. On !Chars, (in Trinity, anyway) it's the third of the dash-like characters – under the letter y. If you are using system font then it's the underlined d, again under the y.

To save all this hassle, all you need to do is use a double hyphen where you want a dash. This is a common practice but I can't demonstrate it because at some stage, I will be doing a global search & replace on this document and the double hyphen will end up as a dash!

Describing keyboards actions

The conventions we use in Archive magazine to represent keyboard and mouse actions are best illustrated by a bit of meaningless sample text:

If you want to press the return key *(no angle brackets on return)* or one of the other keys I would tell you to press <return>, or to press <N>, <Y> or <?>. To start up, press <shift-break> and use <ctrl-shift-f5> *(use f5, not F5)* or double-click on the icon *(<select> is assumed if you don't mention which mouse button)* but click <adjust> *(not "the right hand button")* if you want to add something to the selection. In PipeDream we have control sequences like <ctrl-BSE> for searching which actually means pressing <ctrl-B> and then <S> and then <E> but for convenience we put them all together in one set of angle brackets.

Comments on English style

One of the common errors (well, I think they are errors – others may think they is a matter of style) that I have to correct are that you should never use a preposition to end a sentence *with. And* you should never start a sentence with a conjunction like "and" or "but". But people do! However, it is OK to use "however" to start a sentence. Also, you can use "also" to start a sentence.

As a general rule, writers tend to make their paragraphs too long. It makes the text easier to read if it is broken up into smaller logical units. Also, it is good to use (short) titles at regular intervals to make the structure of the article easier to gather for busy people who haven't time to read every word of every article and just want to find the bit of a review that declares itself to be the "Conclusion".

Writing reviews

While I'm on the subject of reviews, could reviewers try to think themselves into the position of the person reading the review who has never heard of the product? If they want to buy a copy, they need to know, at the very least, how much it costs and who the supplier is. It is also useful if you can mentioned the version number of the software under test so that people can see whether it is the current version that was being tested or an earlier version. A

FlexiFile

John Schild

Minerva Software are marketing Flexifile as a RISC-OS multi-tasking replacement for System Delta Plus, one of the first database management systems to be available for the Archimedes. In attempting to review it, I feel somewhat handicapped by the fact that I have never used System Delta Plus, and it is therefore difficult to judge this important new product by its own ancestry. However, I have come to Flexifile with a number of convictions about what a DBMS (database management system) ought to offer, and after living with it for some weeks my reactions are mixed.

This is serious software aimed at a discriminating market – and it does most things well – but for me it is flawed by some errors and omissions which all but vitiate its many powerful features. Very much to my disappointment, I think I have to conclude that Archimedes users may go on waiting for the definitive DBMS at an accessible price.

I am aware that other potential users, with needs different from my own, might find my criticisms trivial and with this possibility firmly in mind, I have decided to reverse normal procedure and present my conclusions first.

Conclusions

My principle criticisms of Flexifile concern its structure and its input/output facilities. I don't think I am trying to be funny when I say that Minerva probably trusted the writing of Flexi-

file to one of their adventure games experts. It is mouse-mad! Too many important features can only be accessed by the right number of clicks on the correct mouse button over the appropriate bit of the relevant window, and if these functions are in only occasional use, the mouse operations are simply too difficult to remember and very cumbersome to trace through the manual.

Trend setting software products such as Pipedream and Impression have adopted the path of comprehensive menus with key short cuts which can gradually be learned – but every important function can be accessed from a menu, a vital feature of a large program with many possible operations. Using Flexifile as a beginner requires constant reference to the manual to learn the appropriate mouse actions. It demands too much learning time and I do not find it at all intuitive.

My other significant complaint is about the import and export of data, which I find quite inadequately supported. Data can be taken in only from the keyboard or from other Minerva database programs via a slow operating conversion utility. For Flexifile to be seriously useful to existing data managers, Minerva must give us some import facilities for the most common PC programs, and certainly for Pipedream.

My final reservation concerns the utterly frustrating fact that all data taken from Flexifile for importing to another program such as a word processor comes packed out with ASCII character 32 spaces – fine if you are exporting to an old-fashioned mono-spaced WP with easily adjustable line length, but painfully frustrating if you want to take a table into something like an Impression frame. This is unfortunately the case whichever of the report formats is in use. Has the programmer never heard of TSV or CSV formats?

It is wonderful to be able to multi-task with a DTP program and drag the contents of a card straight across into a waiting text frame – but the benefit is simply thrown away if you then have to spend even more time chasing all those irrelevant ASCII 32s (all the more difficult because you can't see them!).

The same limitation is present in a different way in label production. There is a label facility and it is relatively simple to produce a "mask" of the desired fields from a database laid out for label production. However, if a single line requires several fields, e.g. title, first name and surname, Flexifile will not close up the empty spaces in the fields, but leaves unsightly gaps in the printout. It is so frustrating just because it is so unnecessary and Flexifile already costs enough without users being obliged to purchase alternative front ends for adequate report production.

All that said, I want to emphasise that this is not Mickey Mouse software, but packed with powerful and sophisticated features, which I will now try briefly to describe.

Presentation

Flexifile comes on a single 3.5" disc containing the utility and some useful sample files fully documented in a well produced 164 page manual. The manual is divided into tutorial and reference sections, but the tutorial section alone is not sufficient to get the new user started. Minerva have chosen to protect their product with a key disc requirement. Although working discs may be freely created on floppies or a hard disc, the original key disc must be inserted before files can be loaded and work begin. This irksome procedure can be avoided on payment of a further £30 for a single user unprotected version, or a larger sum for a multi-user site licence. Flexifile loads to the icon bar, and operates in a windowed environment alongside other RISC-OS products. In-memory transfer to and from other co-operating packages is generously supported but I found that, in practice, it was necessary to drag filer icons via a RAM disc to set up a path and avoid an error message.

FlexiFile in use

Existing files can be loaded in two different ways. Double clicking on a filer icon will load a file using the minimum of the computer's own

RAM – useful for 1 megabyte systems. Alternatively, dragging the same filer icon to the application icon on the icon bar opens a window allowing the user to set the level of memory use – very helpful in speeding up searches on a large file if enough RAM is available. More than one window can be open at a time and files can be linked, allowing data to be extracted from a second file which contains data matching that in the parent file. This feature falls short of true "relational" properties as described in my article in Archive 4.2 but is still very useful. One limitation is that only two files may be so linked – the true relational model assumes unlimited linkage.

The card and tools windows

Opening a file window reveals the card laid out according to the user's choice, with fields in any desired position in the window. Field names are assigned to each field but need not be displayed on the card. The familiar field types (string, numeric, etc) are supported, as are graphics windows. At the card design stage, fields can be designated as key fields, allowing quick searches to be made. "Soundex" properties can be assigned to any chosen field, speeding up the search for such items as surnames where the precise spelling is not known. Any number of fields can be designated as index fields, allowing the database to be presented at will in different alphabetical orders. These key and index facilities are valuable, but a price has to be paid in terms of the speed of the search operation.

Most reviewers shower praise on Minerva's "video style" tool display used for moving around the database and setting up simple searches. My enthusiasm is tempered by the fact that the different tool functions are mouse selected in a small window, and inadequately labelled, so the beginner is too much at the mercy of the manual. However, once mastered, the tools window is very helpful for browsing a database, making quick searches, selecting an index or subset, adding new cards and initiating field calculations employing a macro definition.

My favourite Flexifile gimmick is that dragging a number to the telephone icon will cause the computer speaker to output Telecom touchtones into the mouthpiece of your phone! If your local exchange has gone digital you can now dial out straight from the database. I like it but I wonder if it still works on a machine which has had the pitch of its voice raised by the fitting of a video enhancer? Does anybody know?

Clicking <menu> over the card window leads off to a range of familiar features.

Macros

Macros are expressions which can be made to operate on the contents of selected fields. They can range from a simple multiplier (for example, to raise all the prices in a price list by the same percentage) to a complex conditional bit of mathematics best left to an expert. Up to 30 lines of macro expressions (conforming to BASIC syntax) can be typed into an edit window or imported by dragging in an ASCII file. Once a macro definition has been entered, it can operate either globally, or on a single displayed card. This is a powerful feature of Flexifile.

Card

Card allows the card display to be resized or the current card selected for deletion. It also allows the entire contents of a card to be exported either to a disc file or to another application, but sadly, trailing all those troublesome spaces. An alternative route to the same end is to drag the mouse pointer with <adjust> across the desired fields only from top left to bottom right, which is obviously more selective. Incidentally, single fields can be dragged out in a similar manner.

File

The most important function of File is to open up the complex search window, allowing search expressions to operate on selected fields and placing the result in a target subset. This is a powerful facility which merits careful study of the manual to get the best out of it. Once a search list has been established, it is stored as a subset and, if desired, just this subset can be displayed in the card window and reports prod-

uced from it. The second function of the file menu allows the compaction of a file which has become untidy through deletions.

Window

The window menu leads off to many functions of which the most important is Reports. I have to confess I find the menu structure here quite bewildering and would urge Minerva to do a bit of rebuilding. Clicking on Report opens a report window onto one of five report formats. Clicking with <menu> over this window allows a different report type to be selected.

Card produces a vertical strip of cards down the screen which can be browsed using the scroll bars, printed or exported.

Sheet brings to the screen a spreadsheet display, to which fields can be added either by dragging from the card window to the report window or by opening up a setup window into which the required field names can be typed. The setup box offers several additional options such as the totalling of numeric fields. The report can either be printed or exported.

Formula allows cards to be selected for printing or exporting according to Flexifile's set of search expressions.

Label allows the production of address labels. I have previously commented that spaces are not stripped from adjacent fields on the same line nor empty fields closed up, leaving the output looking decidedly amateurish. A great pity.

Paged allows for the incorporation of headers in a report covering several pages.

Apart from those ubiquitous ASCII 32s, my other disappointment with the Flexifile reports facility is that it does not allow user-designed reports with flexible layout and strings incorporated alongside search data.

Other essential routines are selected by clicking <menu> over the application icon on the icon bar. *Create* is to be found there, allowing new card layouts to be designed. It works, as obviously it must, but it is far from user friendly. *Fast sort* allows a file to be "mechanically" sorted on the disc rather than relying on a resident index. *Transfer* allows a new database to be cloned from an existing one with fields added or removed.

That, then, is an outline of Flexifile – a powerful piece of programming intelligently exploiting RISC-OS facilities, but strangely lacking in some important respects. If Minerva Software could be persuaded to give us Flexifile II in due course with adequate import and export facilities and a more user friendly structure, it would be a winner. A

Public Key Cryptography

Brian Cowan

The theory of numbers has traditionally been regarded as one of the purest branches of pure mathematics, having no practical applications. The great British mathematician G.H.Hardy was once asked of what benefit to mankind was his study of the theory of numbers. He replied that although of no use, it did no harm, unlike other areas of scientific endeavour. He could not have been more mistaken. It turns out that number theory, particularly that part which deals with prime numbers, is at the heart of all sophisticated coding systems and is therefore used by the military forces throughout the world!

Public key cryptography

In the simple methods for encoding messages, knowledge of the encoding algorithm permits knowledge of the decoding algorithm. Thus, for instance, if the message is encoded by swapping various letters around, then decoding is effected by simply swapping in the reverse way. Public Key Cryptography does not work in this way. Knowledge of the rule by which a message was encoded is not sufficient to permit its decoding. A third piece of information is required: something which relates the encryption and decryption recipes.

Practical operation

So how would this operate in practice? Encoding and decoding are effected by two different keys. These two keys are generated from the third "connecting" key. The owner of these keys can then make public his encryption key for messages he receives (his public key) and people can then send him messages which no one else can decode. So if you want to send someone a secret message you look up his public key and use that for encoding. He decodes it using his private key, known only to himself.

Message authentication

The scheme can also be used in reverse. If you encode a message using your private key then if someone knows it is from you then they can decode it with your public key. The message is not then secret, but the receiver can be sure who sent the message. However, full secrecy may be obtained by the method of double encryption. Having encoded the message with your private key, it is then encoded once again with the receiver's public key. Thus full security is obtained, of great benefit, for instance, in business transactions.

The RSA algorithm

A paper published by Rivest, Shamir and Adleman in 1977 proposed a method for encoding which incorporates the above ideas. The main problem with any method is its security. Is it possible for a dedicated hacker with a powerful computer to crack the code? In other words, knowing the public key, can he find the private key? For the RSA method, cracking the code is related to the factorisation of very large numbers. To factorise the sort of numbers we are dealing with, using current computers, would take a time longer than the age of the universe! Thus the method seems quite secure. *(Roger Sewell, technical editor of the Archimedes Public Key, says that, to be fair, there are some techniques that would factorise it faster than that – it would only take a few hundreds of thousands of years! Ed)*

The Public Key magazine

A magazine has just been published for people interested in the aspects of Public Key Cryptography. There are two sorts of people that this is catering for. Firstly, there is the aspiring mathematician/code breaker and then there is the potential user, concerned with sending and receiving secure messages.

The Public Key caters for both. In the first issue, there are articles explaining the RSA algorithm, one covering the practical essentials and one treating the mathematics of the algorithm. Twenty pages contain a BASIC and assembler program for encryption, decryption and the generation of keys. Clearly it is impracticable to type such a program in by hand, so a disc is supplied containing the program.

Running the program

The program runs as a single task and the user is advised to quit the desktop. I followed the instructions and managed to produce a public and a private key. All went well. Also, I found it quite easy to encode some chunks of text. However, I have not got as far as sending them to someone to see if they can actually decode them!

First Impression

The first issue of the magazine has forty A4 pages, Impressively produced using Impression. The editor is George Foot, and Roger Sewell is the technical editor. The program is straightforward to use and it is certainly a good application for exploiting the power and speed of the Archimedes. At the back of the magazine is a list of public keys of various people. One such person is David Pilling, the author of much high quality and reasonably priced Archimedes software. For all Archimedes owners interested in Public Key Cryptography and all aspects of codes and code breaking, this is the magazine for you. (After Archive, of course!)

Fact file

The Public Key is available from George Foot, "Waterfall", Uvedale Road, Oxted, Surrey, RH8 0EW.

Cost of the magazine is £1 for UK, £2 for EEC countries and £3 for overseas air mail. The disc may be obtained for £2.50. A

Some Notes on I-APL

Alan Angus

I have experimented with I-APL for a while, and it has a lot of potential in mathematics education. Anyone interested in learning or using maths should consider getting a copy of the interpereter. You also need to get a good introductory book on APL. The two books I am using to explore APL are Howard A. Peelle, APL An Introduction published by Holt, Rinehart and Winston 1986 and M. A. Curth, H. Edelmann APL a problem-oriented introduction published by Ellis Horwood 1989. Peelle's book is better for the beginner.

I started off using APL in a very simple way, doing some work on functions with a minimal amount of programming. It rapidly became obvious that you can do a lot of useful work with very little, and that the very limited memory space available (32k!) is not too big a handicap. The reason for the small memory is compatibility across a range of implementations of I-APL for many different machines, however a 32bit Archimedes implementation with large memory, and I imagine high speed, is in an advanced state of development.

The following listings show the contents of my simple functions workspace FUNC .

```
START

THIS IS A SIMPLE SET OF PROGRAMS ON
THE IMPORTANT MATHEMATICAL IDEA OF
FUNCTIONS. YOU CAN THINK OF A
FUNCTION AS A MACHINE THAT TURNS ONE
NUMBER INTO ANOTHER ONE.

THERE ARE 3 LITTLE PROGRAMS, PART1,
PART2, PART3. WORK THROUGH EACH OF
THEM IN TURN. YOU WILL NEED TO KEEP
NOTES OF WHAT YOU DO. AFTER
COMPLETING EACH PART WRITE AN ACCOUNT
OF WHAT YOU DID AND OF ANYTHING YOU
DISCOVERED


PART1

FOUR FUNCTIONS HAVE BEEN DEFINED WITH
THE NAMES A, B, C, D.

YOUR JOB IS TO FIND OUT WHAT THEY DO.
TYPE IN A FUNCTION LETTER FOLLOWED BY
A SPACE AND A NUMBER.

FOR EXAMPLE,          B 4

NOTE WHAT THE COMPUTER GIVES YOU AS A
RESULT.

THE FUNCTION i CAN MAKE YOUR TASK
EASIER. i10 PRODUCES THE LIST

1 2 3 4 5 6 7 8 9 10

TO GET i PRESS THE SHIFT AND I KEYS.

NOW TRY TYPING IN  B i10  WHAT DOES
THE FUNCTION B DO TO THE NUMBERS? TRY
TO FIND OUT WHAT A, C AND D DO TO THE
NUMBERS YOU GIVE THEM.


PART2

NOW THAT YOU KNOW WHAT EACH OF OUR
FUNCTIONS DO TRY THE FOLLOWING
COMBINATIONS.

A B 3

B A 5

B B i5

WHAT DO THEY DO?

NOW TRY OUT OTHER TWO LETTER
COMBINATIONS AND WRITE DOWN WHAT YOU
CAN FIND OUT ABOUT THEM.


PART3

NOTE DOWN THE FOLLOWING SEQUENCES OF
NUMBERS.

EACH ONE CAN BE PRODUCED BY USING A
PAIR OF OUR FUNCTIONS WITH THE i
FUNCTION.

0 1 4 9 16 25 36 49 64 81

1 16 81 256 625 1296

9 36 81 144 225

3 12 27 48 75

3 1.5 1 0 0.75 0.6 0.5

YOUR JOB IS TO FIND THE RIGHT
COMBINATION OF FUNCTIONS SO THAT YOU
CAN REPRODUCE EACH SEQUENCE. FOR
EXAMPLE -1 0 1 2 IS PRODUCED BY THE
COMBINED FUNCTION  C C i4

GOOD LUCK
```

Here is a listing of the function definitions using standard characters to represent the APL characters.

```
Z <- A X
Z <- XxX      squares the input
Z <- B X
Z <- 3xX      outputs 3 times the input
Z <- C X
Z <- X-1      input minus 1
Z <- D X
Z <- ÷X       reciprocal
```

The best is yet to come

This is only a tiny taste of the potential of APL in maths education, using very few of the many functions built in to the interpreter. I have kept it very simple to avoid problems with printing the special APL characters in the magazine. Hopefully, in time a way will be found to overcome this difficulty, and we will see some APL articles in Archive. *(That should be quite possible now that I am doing the magazine on Impression II. Ed.)*

There are many powerful functions in this language, and they operate on scalars, vectors and arrays. Simple combinations of functions can do matrix multiplication and many, many other things. The potential is enormous.

I-APL can supply the program for the Archimedes with a manual for £4.50. They can also supply a number of books, including some APL Press titles which have been difficult to get hold of in recent times. Any enquiries about I-APL should be sent to: I-APL Ltd, 2 Blenheim Rd, St Albans, Herts, AL1 4NR.

The reason why I-APL is so cheap is that it was developed by enthusiasts to make APL available to schools at a minimum cost, and its development has been funded by the British APL Association and others. Many thanks are due to all who are involved in the I-APL project, and I only hope that teachers and students of mathematics will take advantage of the results of all this effort.

If you become an APL addict, why not join the British APL Association and get their journal VECTOR, or at least subscribe to the education newsletter? A

Irlam Instruments	133 London Road, Staines, Middlesex TW18 4HN. (0895-811401)
Krisalis Software	Teque House, Mason's Yard, Downs Row, Moorgate, Rotherham, S60 2HD.
Longman–Logotron	Dales Brewery, Gwydir Street, Cambridge, CB1 2LJ. (0223–323656) *(–460208)*
Minerva Systems	Minerva House, Baring Crescent, Exeter, EX1 1TL. (0392–437756) *(–421762)*
Oak Solutions (p20)	Cross Park House, Low Green, Rawdon, Leeds, LS19 6HA. (0532–502615) *(–506868)*
Ray Maidstone (p13)	421 Sprowston Road, Norwich, NR3 4EH. (0603–407060) *(–417447)*
RESOURCE	Exeter Road, Doncaster, DN2 4PY. (0302–340331)
Silicon Vision Ltd	Signal House, Lyon Road, Harrow, Middlesex, HA1 2AG. (081–422–2274) *(–427–5169)*
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